ENVIRONMENTAL METHODOLOGY REPORT

PRODUCT 7.4 Final

HONOLULU HIGH-CAPACITY TRANSIT CORRIDOR
ALTERNATIVES ANALYSIS / DRAFT ENVIRONMENTAL IMPACT STATEMENT

prepared for:
City and County of Honolulu

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Environmental Methodology Report
Honolulu High-Capacity Transit Corridor Project

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Summary

The City and County of Honolulu Department of Transportation Services (DTS), in coordination with the U.S. Department of Transportation Federal Transit Administration (FTA), will be preparing an Alternatives Analysis (AA) and an Environmental Impact Statement (EIS) to evaluate alternatives that would provide high-capacity transit service on Oahu.

Environmental analysis in the AA will focus on differentiating between the alternatives under consideration. If a particular environmental consideration does not differentiate between proposed alternatives, the AA report will not concentrate on that specific environmental element.

Upon completion, the AA report will be available for public and agency review and comment. Based on the information in the AA report, and agency and public comments on the AA report, the City Council will then select the Locally Preferred Alternative (LPA) for further analysis in a draft EIS. The draft EIS will consider a No Build Alternative, a Transportation System Management (TSM) Alternative, and the LPA selected by the City Council. Other alternatives addressed in the AA report will be discussed briefly. The AA report will be incorporated in the draft EIS by reference, and the basis for the City Council's rejection of the other build alternatives will be reported in the draft EIS. For those alternatives addressed in detail in the draft EIS (No Build, TSM and LPA), the draft EIS will provide additional information on project impacts, and greater detail about mitigation measures likely to be included as part of the TSM and LPA Alternatives.

This report is limited to presenting methods to be used to evaluate the project's effects on the environment. Additional topics important to a comparative evaluation of the alternatives, such as transportation impacts and benefits, cost effectiveness, and financing plans also will be included in the AA report, but are not addressed here because they are not environmental issues.

The following environmental topics have been identified for analysis in the AA report, and are likely to also be addressed in the draft EIS:

- Land Use and Economic Activity
- Neighborhoods and Communities
- Farmlands
- Visual and Aesthetic Resources
- Air Quality
- Noise and Vibration
- Geology and Soils
- Natural Hazards
- Water Resources
- Biological Resources and Ecosystems

- Energy
- Hazardous Materials
- Cultural, Historic, and Archaeological Resources

Chapter 1 Introduction

The City and County of Honolulu Department of Transportation Services (DTS), in coordination with the U.S. Department of Transportation Federal Transit Administration (FTA), has carried out an Alternatives Analysis (AA) to evaluate alternatives that would provide high-capacity transit service on O'ahu. The primary project study area is the travel corridor between Kapolei and the University of Hawai'i at Mānoa (UH Mānoa) (Figure 1-1). This corridor includes the majority of housing and employment on O'ahu. The east-west length of the corridor is approximately 23 miles. The north-south width of the corridor is at most four miles, as much of the corridor is bounded by the Ko'olau and Wai'anae Mountain Ranges to the north and the Pacific Ocean to the south.

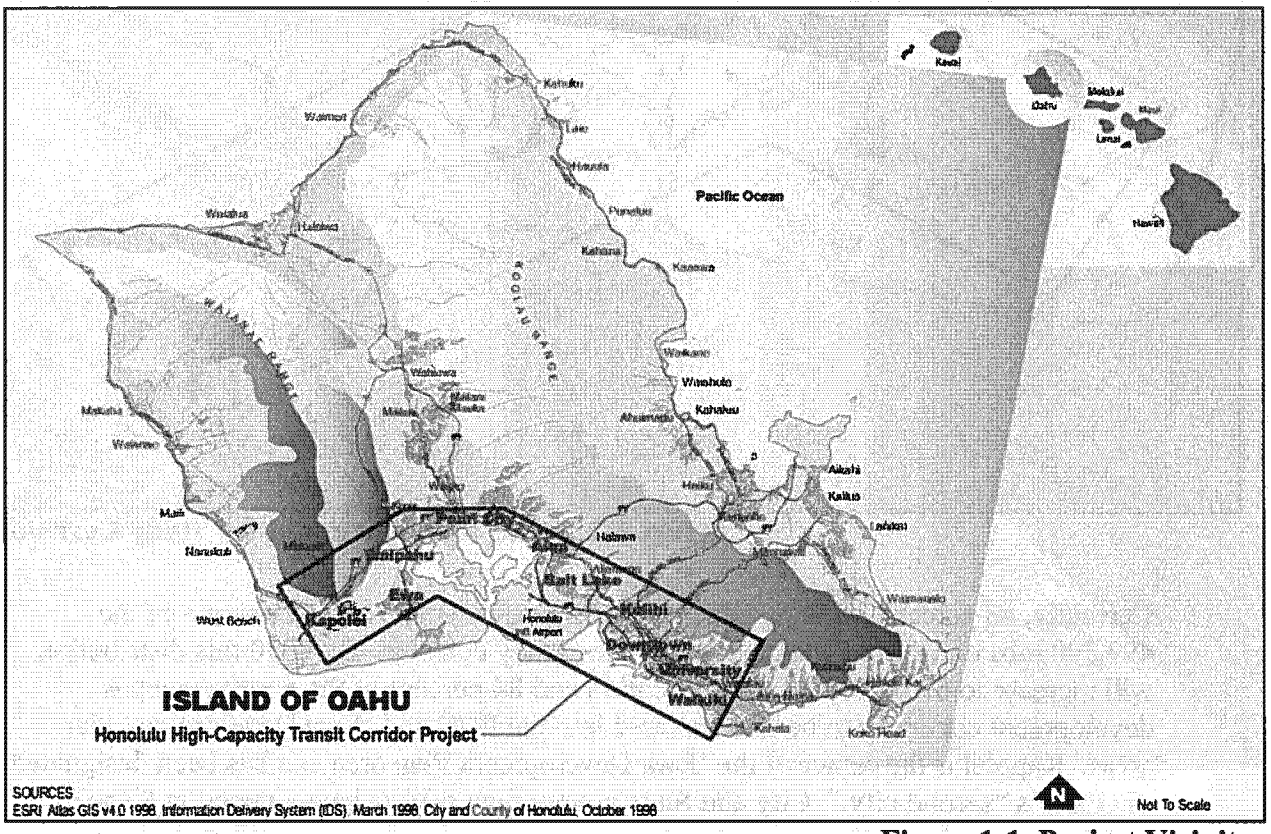


Figure 1-1. Project Vicinity

Project Description

Description of the Study Corridor

The study corridor extends from Kapolei in the west (Wai'anae or 'Ewa direction) to the University of Hawai'i at Mānoa (UH Mānoa) in the east (Koko Head direction), and is confined by the Wai'anae and Ko'olau Mountain Ranges to the north (mauka direction) and the Pacific Ocean to the south (makai direction). Between Pearl City and 'Aiea, the corridor's width is less than one mile between the Pacific Ocean and the base of the Ko'olau Mountains.

The General Plan for the City and County of Honolulu directs future population and employment growth to the 'Ewa and Primary Urban Center (PUC) Development Plan areas and the Central O'ahu Sustainable Communities Plan area. The largest increases in population and employment are projected in the 'Ewa, Waipahu, Downtown, and Kaka'ako districts, which are all located in the corridor (Figure 1-2).

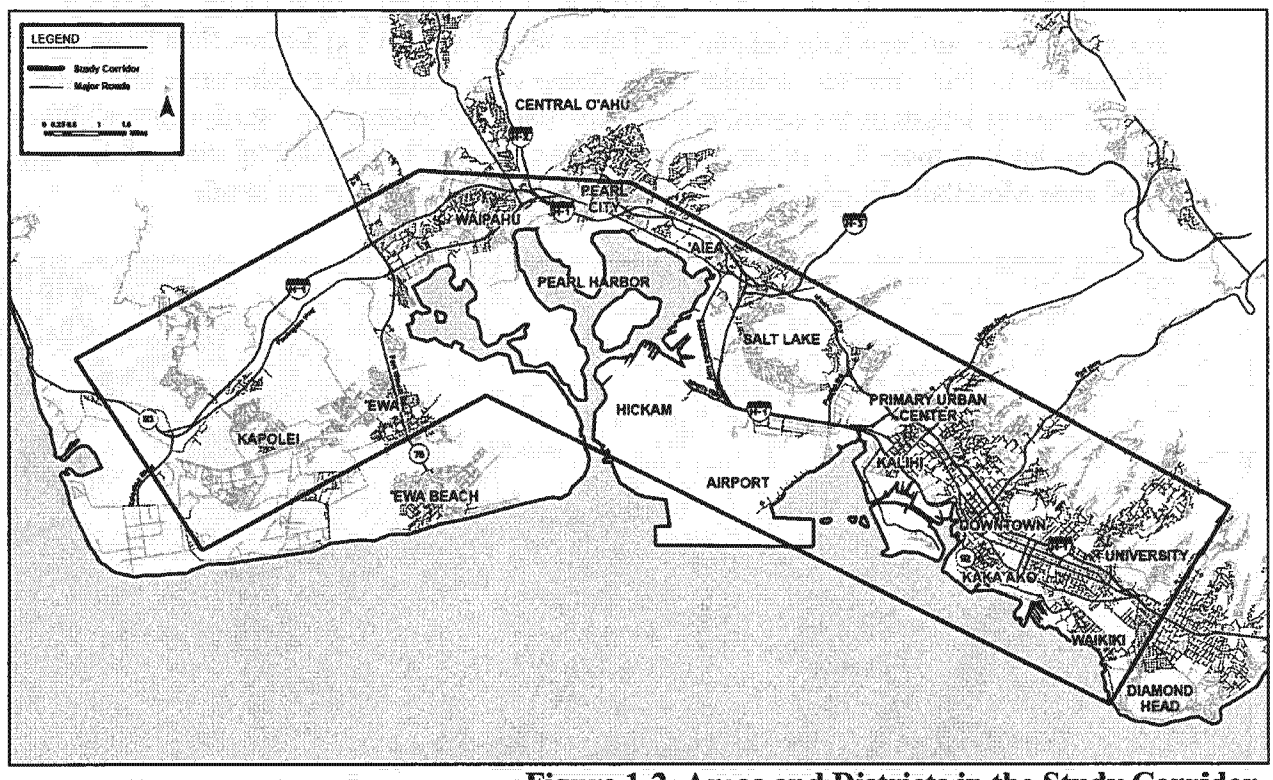


Figure 1-2. Areas and Districts in the Study Corridor

Currently, 63 percent of the 876,200 people living on O'ahu and 81 percent of the 499,300 jobs on O'ahu are located within the study corridor. By 2030 this distribution will increase to 69 percent of the population and 84 percent of the employment as development continues to be concentrated into the PUC and 'Ewa Development Plan areas. Kapolei is the center of the 'Ewa Development Plan area and has been designated as O'ahu's "second city." City and State government offices have opened in Kapolei, and the University of Hawai'i is developing a master plan for a new West O'ahu campus there. The Kalaeloa Community Development District (formerly known as Barbers Point Naval Air Station) covers 3,700 acres adjacent to Kapolei and is planned for redevelopment. The Department of Hawaiian Home Lands is also a major landowner in the area and is planning for residential and retail development. In addition, developers have several proposals to continue the construction of residential subdivisions.

Continuing Koko Head, the corridor follows Farrington and Kamehameha Highways through a mixture of low-density commercial and residential development. This part of the corridor passes through the makai portion of the Central O'ahu Sustainable Communities Plan area.

Farther Koko Head, the corridor enters the PUC Development Plan area, which is bounded by commercial and residential densities that begin to increase in the vicinity of Aloha Stadium. The Pearl Harbor Naval Reserve, Hickam Air Force Base, and Honolulu International Airport border the corridor on the makai side. Military and civilian housing are the dominant land uses mauka of Interstate Route H-1 (H-1 Freeway), with a concentration of high-density housing along Salt Lake Boulevard.

As the corridor continues Koko Head across Moanalua Stream, the land use becomes increasingly dense. Industrial and port land uses dominate along the harbor, shifting to primarily commercial uses along Dillingham Boulevard, a mixture of residential and commercial uses along North King Street, and primarily residential use mauka of the H-1 Freeway.

Koko Head of Nu'uanu Stream, the corridor continues through Chinatown and Downtown. The Chinatown and Downtown areas, with 62,300 jobs, have the highest employment density in the corridor. The Kaka'ako and Ala Moana neighborhoods, comprised historically of low-rise industrial and commercial uses, are being revitalized with several high-rise residential towers currently under construction. Ala Moana Center, both a major transit hub and shopping destination, is served by more than 2,000 weekday bus trips and visited by more than 56 million shoppers annually.

The corridor continues to Waikīkī and through the McCully neighborhood to UH Mānoa. Today, Waikīkī has more than 20,000 residents and provides more than 44,000 jobs. It is one of the densest tourist areas in the world, serving approximately 72,000 visitors daily (DBEDT, 2003). UH Mānoa is the other major destination at the Koko Head end of the corridor. It has an enrollment of more than 20,000 students and approximately 6,000 staff (UH, 2005). Approximately 60 percent of students do not live within walking distance of campus (UH, 2002) and must travel by vehicle or transit to attend classes.

Alternatives under Consideration

Four alternatives will be evaluated in the Alternatives Analysis (AA) report. They were developed through a screening process that considered alternatives identified through previous transit studies, a field review of the study corridor, an analysis of current housing and employment data for the corridor, a literature review of technology modes, work completed by the O'ahu Metropolitan Planning Organization (OMPO) for its Draft 2030 Regional Transportation Plan, and public and agency comments received during a formal project scoping process held in accordance with requirements of the National Environmental Policy Act (NEPA) and the Hawai'i EIS Law (Chapter 343, Hawai'i Revised Statutes). The four alternatives are described in detail in the *Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Definition of Alternatives Report* (DTS, 2006a). The alternatives identified for evaluation in the AA report are as follows:

- No Build Alternative
- Transportation System Management Alternative
- Managed Lane Alternative
- Fixed Guideway Alternative

Alternative 1: No Build

The No Build Alternative includes existing transit and highway facilities and committed transportation projects anticipated to be operational by 2030. Committed transportation projects are those programmed in the O'ahu 2030 Regional Transportation Plan prepared by OMPO. The committed highway elements of the No Build Alternative will also be included in the build alternatives (discussed below).

The No Build Alternative's transit component would include an increase in fleet size to accommodate growth in population, while allowing service frequencies to remain the same as today. The specific number of buses, as well as required ancillary facilities, will be determined during the preparation of the AA.

Alternative 2: Transportation System Management

The Transportation System Management (TSM) Alternative would provide an enhanced bus system based on a hub-and-spoke route network and relatively low-cost capital improvements on selected roadway facilities to give priority to buses. The TSM Alternative would include the same committed highway projects as assumed for the No Build Alternative.

Alternative 3: Managed Lane

The Managed Lane Alternative would include construction of a two-lane, grade-separated facility between Waipahu and Downtown Honolulu for use by buses, paratransit vehicles, and vanpool vehicles. High-occupancy vehicles (HOV) and toll-paying, single-occupant vehicles also would be allowed to use the facility provided that sufficient capacity would be available to maintain free-flow speeds for buses and the above-noted paratransit and vanpool vehicles. Variable pricing strategies for single-occupant vehicles would be implemented to ensure free-flow speeds for high-occupancy vehicles.

Intermediate bus access points would be provided in the vicinity of Aloha Stadium and Middle Street. Buses using the managed lane facility would be restructured and enhanced, providing additional service between Kapolei and other points 'Ewa of the PUC, as well as Downtown Honolulu and UH Mānoa.

Alternative 4: Fixed Guideway

The Fixed Guideway Alternative would include the construction and operation of a fixed-guideway transit system between Kapolei and UH Mānoa. The system could use any fixed-guideway transit technology approved by FTA and meeting performance requirements, and could be automated or employ drivers.

Station and supporting facility locations are currently being identified and would include a vehicle maintenance facility and park-and-ride lots. Bus service would be reconfigured to bring riders on local buses to nearby fixed-guideway transit stations.

Although this alternative would be designed to be within existing street or highway rights-of-way as much as possible, property acquisition at various locations is expected to be necessary. Future extensions of the system to Central O'ahu, East Honolulu, or within the corridor are possible, but are not being addressed in detail at present.

A broad range of modal technologies was considered for application to the Fixed Guideway Alternative, including light rail transit, personal rapid transit, automated people mover, monorail, magnetic levitation (maglev), commuter rail, and emerging technologies still in the developmental stage. Several technologies were selected in an earlier screening process and will be considered as possible options for the fixed-guideway technology. Technologies that were not carried forward from the screening process include personal rapid transit, commuter rail, and the emerging technologies. The screening process is documented in the *Honolulu High-Capacity Transit Corridor Project Screening Report* (DTS, 2006b).

The study corridor for the Fixed Guideway Alternative will be evaluated in five sections to simplify analysis and impact evaluation in the AA process and report. In general, each alignment under consideration within each of the five sections may be combined with any alignment in the adjacent sections.

Each alignment has distinctive characteristics and environmental impacts and provides different service options. Therefore, each alignment will be evaluated individually and compared to the other alignments in each section. The sections that will be evaluated and the alignments being evaluated for each section are listed in Table 1-1. In addition to the combinations of alignments, a shorter 20-mile Alignment also was evaluated.

Table 1-1. Fixed Guideway Alternative Analysis Sections and Alignments

Section	Alignments Being Considered
I. Kapolei to Fort Weaver Road	Kamokila Boulevard/Farrington Highway
	Kapolei Parkway/North-South Road
	Saratoga Avenue/North-South Road
	Geiger Road/Fort Weaver Road
II. Fort Weaver Road to Aloha Stadium	Farrington Highway/Kamehameha Highway
III. Aloha Stadium to Middle Street	Salt Lake Boulevard
	Makai of the Airport Viaduct
	Mauka of the Airport Viaduct
	Aolele Street
IV. Middle Street to Iwilei	North King Street
	Dillingham Boulevard
V. Iwilei to UH Mānoa	Hotel Street/Kawaiaha'o Street/Kapi'olani Boulevard with or without Waikīkī Branch
	Hotel Street/Waimanu Street/Kapi'olani Boulevard with or without Waikīkī Branch
	Nimitz Highway/Queen Street/Kapi'olani Boulevard with or without Waikīkī Branch
	Nimitz Highway/Halekauwila Street/Kapi'olani Boulevard with or without Waikīkī Branch
	Beretania Street/South King Street
	Waikīkī Branch

Project Purpose

The purpose of the Honolulu High-Capacity Transit Corridor Project is to provide improved mobility for persons traveling in the highly congested east-west transportation corridor between Kapolei and UH Mānoa, confined by the Wai'anae and Ko'olau Mountain Ranges to the north and the Pacific Ocean to the south. The project would provide faster, more reliable public transportation services in the corridor than those currently operating in mixed-flow traffic. The project would also provide an alternative to private automobile travel and improve linkages between Kapolei, the urban core, UH Mānoa, Waikīkī, and urban areas in-between. Implementation of the project, in conjunction with other improvements included in the 2030 O'ahu Regional Transportation Plan (ORTP), would moderate anticipated traffic congestion in the corridor. The project also supports the goals of the O'ahu General Plan and the ORTP by serving areas designated for urban growth.

Project Area Needs

Improved Mobility for Travelers Facing Increasingly Severe Traffic Congestion

The existing transportation infrastructure in the corridor between Kapolei and UH Mānoa is overburdened handling current levels of travel demand. Motorists experience substantial traffic congestion and delay at most times of the day during both the

weekdays and weekends. Average weekday peak-period speeds on the H-1 Freeway are currently less than 20 miles per hour (mph) in many places and will degrade even further by 2030. Transit vehicles are caught in the same congestion. Travelers on O'ahu's roadways currently experience 51,000 vehicle hours of delay, a measure of how much time is lost daily by travelers stuck in traffic, on a typical weekday. This is projected to increase to more than 71,000 daily vehicle hours of delay by 2030, assuming implementation of all of the planned improvements listed in the ORTP (except for a fixed guideway system). Without these improvements, the ORTP indicates that daily vehicle-hours of delay could increase to as much as 326,000 vehicle hours.

Current a.m. peak-period travel times for motorists from West O'ahu to Downtown average between 45 and 81 minutes. By 2030, after including all of the planned roadway improvements in the ORTP, this travel time is projected to increase to between 53 and 83 minutes. Average bus speeds in the system have been decreasing steadily as congestion has increased. Currently, express bus travel times from 'Ewa Beach to Downtown range from 45 to 76 minutes and local bus travel times from 'Ewa Beach to Downtown range from 65 to 110 minutes during the peak period. By 2030, these travel times are projected to increase by 20 percent on an average weekday. Within the urban core, most major arterial streets will experience increasing peak-period congestion, including Ala Moana Boulevard, Dillingham Boulevard, Kalākaua Avenue, Kapi'olani Boulevard, King Street, and Nimitz Highway. Expansion of the roadway system between Kapolei and UH Mānoa is constrained by physical barriers and by dense urban neighborhoods that abut many existing roadways. Given the current and increasing levels of congestion, a need exists to offer an alternative way to travel within the corridor independent of current and projected highway congestion.

Improved Transportation System Reliability

As roadways become more congested, they become more susceptible to substantial delays caused by incidents, such as traffic accidents or heavy rain. Even a single driver unexpectedly braking can have a ripple effect delaying hundreds of cars. Because of the operating conditions in the study corridor, current travel times are not reliable for either transit or automobile trips. To get to their destination on time, travelers must allow extra time in their schedules to account for the uncertainty of travel time. This is inefficient and results in lost productivity. Because the bus system primarily operates in mixed-traffic, transit users experience the same level of travel time uncertainty as automobile users. A need exists to reduce transit travel times and provide a more reliable transit system.

Accessibility to New Development in 'Ewa/Kapolei/Makakilo as a Way of Supporting Policy to Develop the Area as a Second Urban Center

The General Plan for the City and County of Honolulu projects the highest population growth rates for the island will occur in the 'Ewa Development Plan area (comprised of the 'Ewa, Kapolei, and Makakilo communities), which is expected to grow by 170 percent between 2000 and 2030. This growth represents nearly 50 percent of the total growth projected for the entire island. The Wai'anae, Wahiawā, North Shore, Windward,

Waimānalo, and East Honolulu areas will have population growth of between zero and 16 percent because of this policy, which keeps the country "country." Kapolei, which is developing as a "second city" to Downtown Honolulu, is projected to grow by nearly 600 percent to 81,100 people, the 'Ewa neighborhood by 100 percent, and Makakilo by 125 percent between 2000 and 2030. Accessibility to the overall 'Ewa Development Plan area is currently severely impaired by the congested roadway network, which will only get worse in the future. This area is less likely to develop as planned unless it is accessible to Downtown and other parts of O'ahu; therefore, the 'Ewa, Kapolei, and Makakilo area needs improved accessibility to support its future growth as planned.

Improved Transportation Equity for All Travelers

Many lower-income and minority workers live in the corridor outside of the urban core and commute to work in the PUC Development Plan area. Many lower-income workers also rely on transit because of its affordability. In addition, daily parking costs in Downtown Honolulu are among the highest in the United States (Colliers, 2005), further limiting this population's access to Downtown. Improvements to transit capacity and reliability will serve all transportation system users, including low-income and under-represented populations.

Project Schedule

Projects developed through the FTA New Starts process progress through many stages from system planning to operation of the project. The Honolulu High-Capacity Transit Corridor Project is currently in the Alternatives Analysis phase, which includes defining and evaluating specific alternatives to address the purpose of and need for the project as discussed in this chapter. The anticipated project development schedule for completion of the 20-mile Alignment is shown in Figure 1-3.

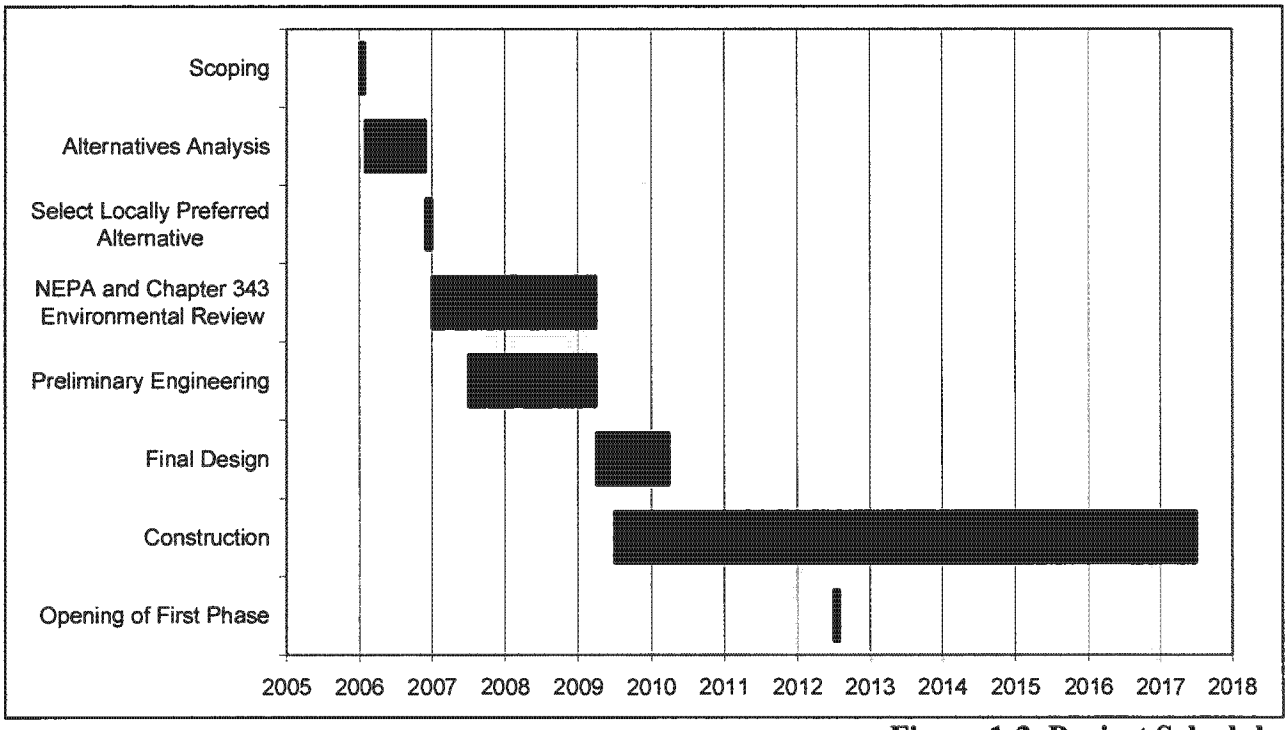
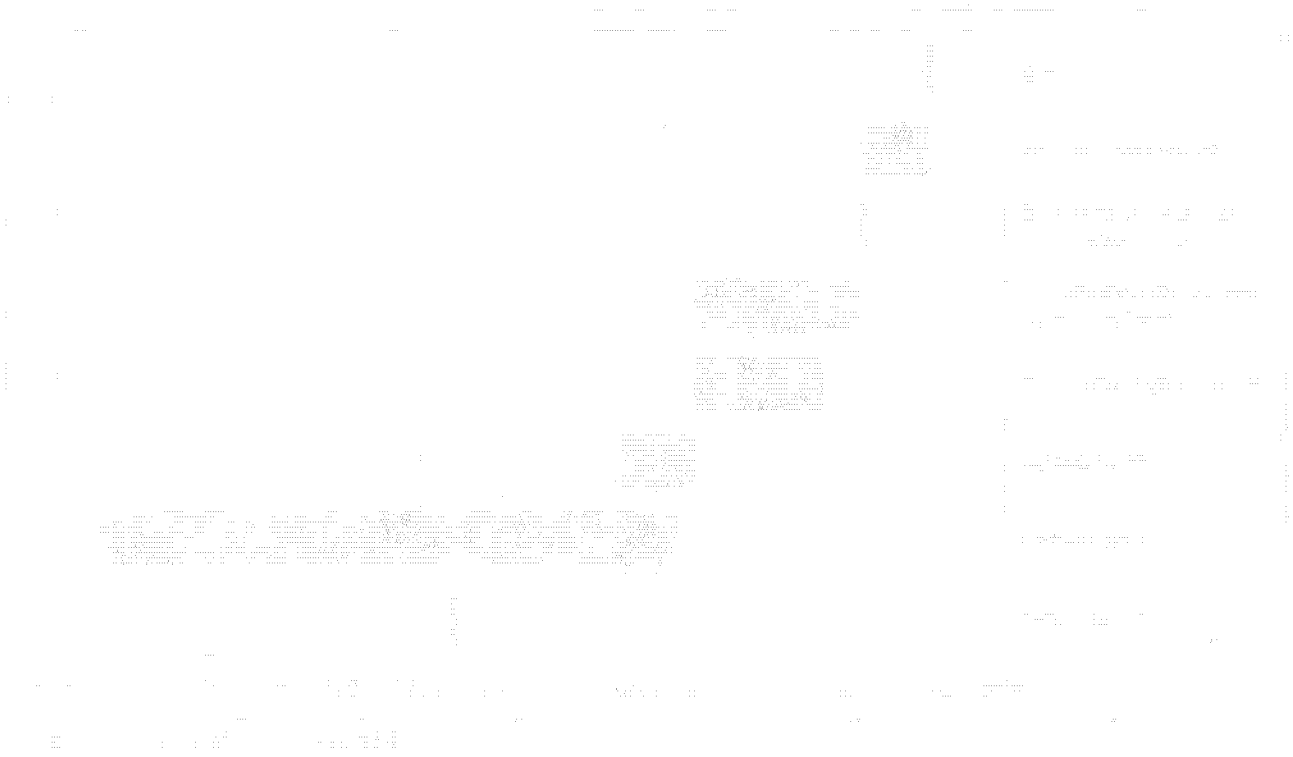


Figure 1-3. Project Schedule



Chapter 2 Technical Methods

Alternatives being considered for the Honolulu High-Capacity Transit Corridor Project will be compared across a range of environmental characteristics during the Alternatives Analysis (AA) process. Environmental analysis in the AA will focus on differentiating the alternatives. If all alternatives would have a similar effect on a specific environmental element, that environmental element will receive less attention than those elements that differentiate among alternatives.

Upon completion, the AA report will be available for public and agency review and comment. Based on the information in the AA report, and agency and public comments on the AA report, the City Council will then select the Locally Preferred Alternative (LPA) for further analysis in a draft EIS. The draft EIS will consider a No Build Alternative, a Transportation System Management (TSM) Alternative, and the LPA selected by the City Council. Other alternatives addressed in the AA report will be discussed briefly. The AA report will be incorporated in the draft EIS by reference, and the basis for the City Council's rejection of the other build alternatives will be reported in the draft EIS. For those alternatives addressed in detail in the draft EIS (No Build, TSM and LPA), the draft EIS will provide additional information on project impacts and greater detail about mitigation measures likely to be included as part of the TSM and LPA Alternatives.

After selection of the LPA, DTS will apply for FTA approval to begin preliminary engineering on the LPA. During preliminary engineering, additional project details and information will be developed and refined. When additional project details are available, further environmental studies and preliminary design will be conducted to minimize adverse impacts and increase benefits. The results will be disclosed in the final EIS.

During the scoping process, agencies and the public were consulted about what environmental resources are important within the study corridor (DTS, 2006). Methods have been developed to evaluate effects on the identified resources. The evaluation of each environmental aspect in the AA report will include the following:

- Short-term impacts occurring during construction
- Long-term impacts occurring after project completion
- Direct impacts caused by the project
- Secondary impacts resulting at a future point in time or at a location distant from the immediate project vicinity
- Cumulative impacts considering the incremental impact when added to other past, present, and reasonably foreseeable future actions
- Mitigation measures likely to be included to reduce impacts associated with the project
- A level of detail consistent with whether the environmental aspect differentiates between alternatives, and the expected magnitude of the impact
- Description of coordination with concerned agencies, groups, and individuals

The environmental studies will concentrate on evaluating the differences between the alternatives and disclosing potential impacts. Project effects will be reported by alternative, and for the Fixed Guideway Alternative, by alignment within each analysis section. Because the level of design detail available will increase as the project develops, the environmental analysis will be refined throughout the project. Although the technical methods proposed to support completion of the AA report are well defined, the methods proposed to support future phases of the project are likely to be revised as further information becomes available.

Land Use and Economic Activity

To support the evaluation of each alternative relative to project objectives, the following measures will be tabulated in the *Land Use Plans and Policies Technical Repor* , *Environmental Justice/Social Impacts Technical Report* and *Economics Technical Report*:

- Major activity centers connected by each alternative
- Numbers of employees and residents within 1/2 mile of stations or access points
- Number of designated transit nodes served by the alternative
- Transit Oriented Development potential
- Number of residents within a 30-minute transit travel distance from downtown and Kapolei
- Amount of vacant and underdeveloped land within 1/2 mile of stations
- Relative degree of disruption or constraint on future development
- Degree of consistency with adopted plans and policies

Land Use

Existing population, employment characteristics and land use patterns in the corridor will be determined. Land use impacts of the alternatives will be identified. The alternatives will be assessed in terms of their support of transit oriented development (TOD), and transit ridership potential. Potential mitigation measures will be identified to reduce negative land use impacts and enhance positive land use development that would support transit.

Existing Conditions

Prior to undertaking field studies, a search will be made of previous studies conducted in the project corridor. Information from the latest Primary Corridor Transportation Project studies, census, and existing land use data from the City and County of Honolulu Department of Planning and Permitting (DPP) will be assessed. Land use distribution will be calculated by corridor section. A general description of the existing social and economic characteristics of each corridor section will be provided for the proposed alignments.

Socio-economic statistics will be gathered by census tracts or traffic analysis zones (TAZs), whichever is more consistent with data used elsewhere in the AA report, and the

outer limits of the analysis will be approximately one-half mile from the center-line of the alternative alignments.

Environmental constraints to future development such as wetlands, steep topography, poor soils, and contaminated sites will be identified, evaluated and shown on a map.

Impacts and Mitigation

Land use impacts of the proposed alternatives will be identified to support evaluation of TOD potential and to maximize ridership. Land use planning conducted in the study area will be reviewed and information will be collected from the DPP, Campbell Estate (as the Kapolei developer), the University of Hawaii, and other relevant planning and development studies and reports.

A general description of the land use impacts will be written for the alternative alignments within each section. The size of the land use impact corridor will be between 1/4 and 1/2 mile surrounding each station (i.e., within easy walking distance), transit center, or node, as appropriate for the alternative. Each section will be rated for TOD potential according to the following FTA New Starts Land Use Factors:

- Existing land use
- Existing station area development
- Existing station area development character
- Existing station area parking supply and existing regional parking policies
- Containment of sprawl
- Planned density and market trends for development within corridor and region
- Growth management policies
- Transit-supportive corridor policies
- Plans and policies to increase station area development
- Plans and policies to enhance transit-friendly character of station area development
- Parking policies
- Supportive zoning regulations near transit stations
- Zoning ordinances that support increased development density in transit station areas
- Zoning ordinances that enhance transit-oriented character of station area development
- Zoning allowances for reduced parking and traffic mitigation
- Tools to implement land use policies
- Endorsement and participation of organizations in development and planning process
- Tools and actions to promote transit-oriented development
- Involvement of development community in supporting station area plans
- Public involvement in corridor and station area planning
- Performance of land use policies
- Demonstrated cases of development affected by transit-oriented policies
- Corridor development targets
- Station area development proposals and status

- Other land use considerations, which include other circumstances, conditions, or constraints under which the transit agency operates that influence local and regional land use policies, plans and implementation.

Potential mitigation measures will be identified to reduce negative land use impacts and to enhance positive land use development that would support transit. This will be accomplished by identifying potential negative impacts and measures to be taken by government agencies to mitigate adverse effects and enhance positive effects.

Economic Activity

The economic analysis will focus primarily on the increased employment and income associated with the construction and operation of the project. In addition, the economic analysis will provide a qualitative assessment of station area development potential and induced impacts. Detailed quantitative assessments are not anticipated for the AA report, but the qualitative assessment to be provided will be sufficient to differentiate among the alternatives.

Direct transportation system user benefits, primarily travel time savings, will be developed as part of the FTA-mandated cost-effectiveness analysis. In subsequent stages, these benefits can become the basis for a more extensive benefit-cost-analysis, including not only the value of travel time savings and the benefits associated with reduced auto use (e.g., vehicle cost savings, reduced emissions and other environmental benefits, reduced parking requirements and possible reduced highway investment costs).

The basis for construction employment and income impacts will be each alternative's construction cost estimates and income and employment multipliers derived from the Hawaii State Input-Output model (DBEDT, 2002). To the greatest extent possible, the results of the analysis will reflect the "net effects" of the project, assuming that given percentages of the project's costs will be financed by local funding sources. The "net effects" reflect the transfer of tax revenues from households to the project, and ultimately to construction activity. Typically, household consumption generates a lesser multiplier effect than does construction activity, although there are greater outward leakages in Hawaii than in most states. The result of this analysis will be projected levels of total employment and income generated by the project, with employment expressed in person years of employment.

Operational impacts of the proposed project alternatives are roughly similar to the construction analysis discussed above, although the sectors affected are different. For operational impacts, the transportation sector is directly affected, rather than the construction sector. Additionally, employment and income effects of operational impacts are permanent, in contrast to the transient effects of construction.

Neighborhoods and Communities

The potential effect of the Honolulu High-Capacity Transit Corridor Project on various social and community elements within the vicinity of the project will be analyzed. The social elements to be evaluated include:

- Community Cohesion
- Displacements and Relocations
- Environmental Justice
- Non-motorized Transportation
- Services and Public Safety
- Utilities
- Parklands

The approach to the neighborhood and communities impact assessment includes an inventory of existing conditions and an evaluation of potential impacts of the project during and after construction (planning horizon year 2030). A technical report will be prepared that will discuss the various findings for each of the above noted elements. Following the selection of the locally preferred alternative (LPA), a supplemental report will be prepared. While the report prepared as part of the AA process will describe the social and community impacts of each alternative relative to one another, a supplemental analysis will be prepared to support the draft EIS that will focus on the effects of the LPA.

To support the evaluation of each alternative relative to project objectives in the AA, the following measures will be tabulated in the *Environmental Justice/Social Impacts Technical Report*:

- Comparison of project impacts and benefits by community in the corridor
- Displacement within low income communities
- Proximity of transit to transit-dependent populations
- Number of transit trips generated by transit-dependent population
- Connection of transit-dependent populations to destinations
- Use of parklands
- Overall number of displacements
- Property access impacts
- Temporary access impacts during construction
- Number of community facilities affected

Community Cohesion

Impacts Analysis

Background information on the community setting, socioeconomic characteristics, and trends of the project area will be identified based on year 1990 and 2000 US Census data. The characteristics to be analyzed include population, housing and households, age, ethnicity (including linguistic isolation), employment, and income.

Census tracts located along and adjacent to the proposed project alignments will be identified. Data for these census tracts within the study area will be compared to similar data for the Ewa, Central Oahu, and Primary Urban Center development plan areas and for the City and County of Honolulu (Island of Oahu) overall. The data will give general characteristics of the community in comparison to the development plan areas and Oahu overall. A comparison of the data will also be used for identification of environmental justice issues (described below).

Community cohesion relates to the "sense of belonging" or level of attachment that residents have to their neighborhood, neighbors, groups, or establishments, usually as a result of interactivity or perceived association. Cohesion is a social attribute that indicates a higher than average sense of community, common responsibility, social interaction within a limited geographic space, an interdependence that serves an assimilating function, or a number of other localized social purposes (FTA, 1986).

This environmental element includes population growth, community cohesion, changes in quality of life, changes in community character (e.g. urbanization), and secondary and indirect impacts. Identification of cultural practices within the study corridor may help to characterize communities and neighborhoods. Potential impacts to cultural activities and resources (such as cultural practices) will be reviewed and evaluated.

To assess potential community cohesion impacts caused by the project, the various factors listed above will be considered. Based on these factors, potential project-related impacts to be evaluated include: disturbances to a community's geographic continuity; disturbances to cultural activities or other sources of interaction; reduction of economic opportunity; and adverse changes in the availability of services, utilities, and housing affecting community cohesion. The analysis also will consider cultural resources, transportation effects, analysis of impacts to utilities and public services, evaluation of environmental justice issues, the estimated number and type of displacements and relocations, and input from the public involvement program.

Mitigation Development

Proposed mitigation development strategies that will be developed during draft EIS analysis would include information gathered during on-going contact with residents in the project vicinity during public outreach efforts. Providing opportunities for community involvement early in the project planning stages is critical to determine appropriate and successful mitigation measures that will promote sustainable communities (Higgs and Gustafson, 1985).

Displacements and Relocations

Alternatives Analysis Phase Methodology

The estimated number and type of property acquisitions needed for the proposed project will be identified during the AA process (including partial and full property takes). The type of properties (e.g., residential, commercial, industrial, etc.) will be determined using readily available data such as aerial photography, land use and zoning maps, and field

surveys. The estimated number and type of property acquisitions will be used for the comparative evaluation of the alternatives in the AA report.

Draft EIS Phase Methodology

Once the LPA has been selected, a supplemental report will be issued, which will include identification of the characteristics of potential relocations due to the LPA's possible right-of-way acquisitions; identification and evaluation of potential relocation and property acquisition difficulties; evaluation of impacts to the local tax base; and discussion of pertinent relocation assistance programs and policies.

Potential relocation and property acquisition information will be summarized in sufficient detail to explain the specific relocation context, including any anticipated problems and proposed solutions. Secondary sources of information will include census data, available economic reports, and community leaders and local officials.

If construction of the LPA results in partial and/or full acquisitions, the following information regarding households and businesses will be discussed commensurate with the level of impacts and the extent they are likely to occur (in accordance with FHWA Technical Advisory T 6640.8A (Guidance for Preparing and Processing Environmental and Section 4(f) Documents)):

- An estimate of the number of households to be displaced, including family characteristics (e.g., minority, ethnic, elderly, handicapped, income level, owner/tenant status). However, in order to protect the privacy of those affected, where there are very few displacements, information on race, ethnicity, and income levels will not be included in the environmental document.
- A discussion comparing available housing in the area with the housing needs of those displaced.
- A discussion of the measures to be taken where the existing housing inventory is insufficient, does not meet relocation standards, or is not within the financial capability of the displacees.
- A discussion of any affected neighborhoods, public facilities, non-profit organizations, and families having special needs which may require special relocation considerations and the measures proposed to resolve these relocation concerns.
- An estimate of the numbers, descriptions, types of occupancy (owner or tenant), and size of businesses (number of employees) to be displaced. If warranted, the discussion will identify sites available in the area where the affected businesses may relocate; the likelihood of such relocation; and potential impacts on individual businesses caused by displacement, or in the event no displacements occur, the proximity to the proposed project.

The draft EIS will include a statement that (1) the acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended; and (2) relocation resources will be made available to all residential and business relocatees without discrimination.

Environmental Justice

Regulatory Compliance and Guidance

In order to identify the project's effects on minorities and low-income populations, an environmental analysis will be prepared in accordance with Title VI of the Civil Rights Act of 1964 (CRA) and Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994). In addition to the requirement of CRA Title VI and EO 12898, the following regulations would also apply to the project's environmental justice analysis and outreach efforts:

- U.S. Department of Transportation Order 5610.2; and
- Executive Order 13166 pertaining to people who are Limited English Proficient (LEP) and grounded on Title VI (signed on August 11, 2000).

The following documents will be used as guidance for the project's environmental justice outreach and analysis efforts:

- FHWA/FTA Public Involvement Techniques for Transportation Decision-making (September 1995);
- FTA Resource Information Center – Environmental Justice: http://www.fta.dot.gov/transit_data_info/reports_publications/publications/environment/4805_5139_ENG_HTML.htm;
- Environmental Justice in the OMPO Planning Process: Defining Environmental Justice (March 2004);
- FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (December 2, 1998);
- Council on Environmental Quality, Environmental Justice Guidance Under the National Environmental Policy Act (December 10, 1997); and
- Hawaii Department of Transportation, Title VI Plan (2003).

Figure 2-1 describes the process by which environmental justice will be analyzed for the proposed project.

Alternatives Analysis Phase Methodology

Populations that meet the federal definitions for protected group status (minority and/or low-income population) under Executive Order 12898 will be referred to as "communities of concern". The term "low-income", in accordance with U.S. Department of Transportation Order 5610.2 and agency guidance, is defined as a person with household income at or below the Department of Health and Human Services (HHS) poverty guidelines. The U.S. Census Bureau has developed poverty thresholds, which are used for calculating all official poverty population statistics. Census Bureau compares the thresholds to a family's income to determine its poverty status. Poverty status determined by the Census Bureau will be used to determine low-income populations within the study corridor.

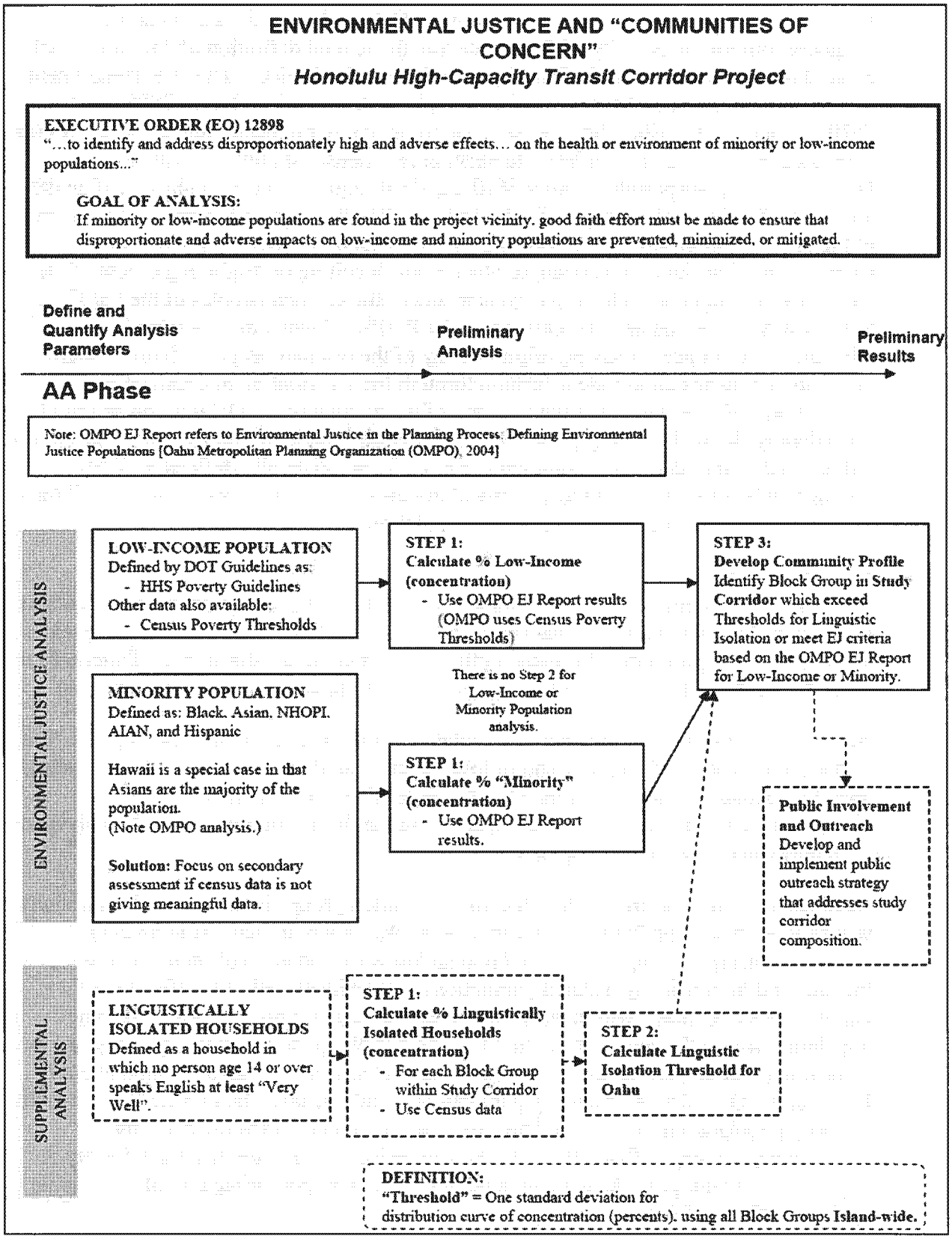


Figure 2-1. Environmental Justice Analysis

While not strictly appropriate for application on Oahu, where Asians and Pacific Islanders comprise a majority of the population, the federal definition of "minority" will be used for the Honolulu High-Capacity Transit Corridor Project. The U.S. Department of Transportation issued Order 5610.2 to comply with Executive Order 12898. Order 5610.2 generally describes the process to incorporate environmental justice principles (as embodied in the Executive Order) into existing programs and policies. The U.S. Department of Transportation Order 5610.2 and subsequent agency guidance define the term "minority" to include any individual who is: Black (a person having origins in any of the black racial groups of Africa); Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition). Recognizing that the majority of the population on Oahu is comprised of the federally-defined minority populations, a supplemental identifier (linguistic isolation) will be analyzed to determine communities of concern. Federally defined minority groups will be identified, but the analysis of effects on communities of concern will focus on low-income and linguistically isolated populations.

Impacts Analysis

The intent of soliciting input from communities of concern is to encourage disadvantaged populations to articulate issues that should be addressed before they become complaints, and to provide opportunities for meaningful involvement in the discussion of alternatives analysis, location of features, and/or design of the alternatives throughout the project.

Analysis of impacts to disadvantaged populations consists of three integrated parts. The first is identification of minority and/or low-income populations within the project study area; the second part is a determination of whether they will experience disproportionately high and adverse impacts; and the third is outreach to and involvement of minority and low-income populations.

Ethnic and racial minority and low-income population groups in the affected community will be identified using 2000 U.S. Census Data. As shown in Step 1 (Figure 2-1), concentrations (percentage of the total population within an area) of minority, low-income, and linguistically isolated populations will be identified. Identification of communities of concern will be based on the percentage of minority or low-income population within the census tracts that is meaningfully greater than the minority or low-income population percentage in the relevant Development Plan area or Oahu overall. Based on CEQ guidance, "minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." (CEQ, 1997).

The fifty percent benchmark is not meaningful because Hawaii's overall population composition is greater than 50 percent minority; therefore, the definition of "minority" will be used only when the minority population of the affected area is meaningfully greater than the surrounding population. Based on knowledge of the ethnic composition on Oahu overall, "meaningfully greater" will be defined as when there is a concentration greater than the defined threshold. The "threshold" will be defined as one standard deviation from the island-wide average concentration for all block groups or census tracts island-wide. Low-income population groups will be identified when there is a greater than one standard deviation difference from the island-wide average. Linguistically isolated population groups will be identified when there is a greater than one standard deviation difference from the island-wide average. Obtaining the island-wide average and standard deviation is shown as Step 2 in Figure 2-1. A map of those block groups that contain a substantially greater concentration of minority or low-income residents and census tracts that contain a substantially greater concentration of linguistically isolated residents (because data is not available at the block group level) when compared to Oahu as a whole will be mapped to develop a preliminary community profile (Step 3 in Figure 2-1).

Draft EIS Phase Methodology

Census data can only provide a preliminary setting of the communities in the study corridor. Once the preliminary information from the census data has been obtained, the results of the community profile will be refined using input from the project's public outreach experts, social service providers, available agency data, additional census data, and TheBus survey data. Community service facilities will be contacted as needed to identify potential communities of concern. Available agency data can include information such as reading proficiency from the Hawaii Department of Education. In addition, census data identifying populations likely to be transit dependent, such as housing units with no cars, populations of children or senior citizens, and disabled populations, will be used to supplement input from community services facilities and public outreach experts. TheBus survey results may also support the identification of transit dependent communities.

Areas of potential communities of concern will be identified using the guidance documents listed above and data gathered from the U.S. Census Bureau, community service facilities, and field surveys. These areas will then be mapped and in consultation with FTA, and FHWA a preliminary assessment of areas with possible environmental justice impacts will be determined.

The extent to which high and adverse impacts fall disproportionately on minority and low-income populations will be determined for each alternative. This analysis will address both the issues that were raised during the outreach program and any pertinent impacts identified in the technical analysis prepared for this project. The final step is to determine which high and adverse impacts, if any, are excessively disproportionate for any alternative. The determination of disproportionate impacts generally will be based on a comparison of the impacts to the disadvantaged population compared to other groups within the corridor. Using this approach ensures that the analysis considers both

the positive benefits to and the negative effects on the areas most directly served by each alternative. Other factors that may be taken into account include design, comparative impacts, relative benefits that accrue to the community, and the relevant number of similar existing and planned system elements in non-minority and non-low-income areas.

Outreach

At each stage that the community profile is developed and refined, the information obtained can be used to refocus or develop new public outreach strategies, if necessary, so that meaningful involvement in the discussion of alternatives analysis, location of features, and/or design of the alternatives throughout the project process can be sought from the public.

Public information materials will be produced as part of the overall public involvement program. These materials are anticipated to include flyers advertising upcoming public meetings, brochures providing information about the proposed project, and other printed material as necessary. Identified disadvantaged populations will be informed about public involvement activities and encouraged to attend, provide input, or be added to the project mailing list.

In order to reach populations who do not speak or read English, information on obtaining printed materials will be available in other languages. The decision to have the materials available in other languages will be made upon request and/or depending on what is learned from public involvement activities and contact with community organizations, churches and other groups. Materials are potentially needed include Japanese, Korean, Samoan, Tongan, Ilocano, Spanish, Vietnamese, Laotian, and Chinese.

Flyers advertising public meetings and other project information will be mailed to stakeholders on the project mailing list. For environmental justice outreach, these flyers will also be mailed to potential environmental justice neighborhoods (in the appropriate language) and provided to the churches and community service organizations listed in Table 2-1, which may have access to communities of concern.

Non-motorized Transportation

Potential impacts to the non-motorized transportation system in the project area will be addressed, including local access and circulation. Temporary and long-term impacts on traffic conditions and transit service will be identified. In addition, existing and planned pedestrian and bicycle access within the project area will be evaluated to determine potential project impacts to non-motorized transportation within the project area. Information will be obtained from the *Transportation Impact Results Report* to be prepared for the project.

Table 2-1. Environmental Justice Outreach List

Affordable Housing and Homeless Alliance	Korea Daily of Hawaii
Aloha United Way	Korean Presbyterian Church of Honolulu
Angel Network Charities	Lanakila Health Center
Big Brothers Big Sisters of Honolulu	Legal Aid Society of Hawaii
Boys and Girls Club of Hawaii	Maililand
Catholic Charities Community and Immigrant Services	Mental Health Kokua
Catholic Charities Hawaii	Moiliili Community Center
Central Samoan Assembly of God	Na Loio
YMCA	New Hope Christian Fellowship
Child and Family Service	Nikkan Sun (newspaper)
Child and Family Services	Nuuanu Baptist Church
Chinese Lutheran Church	Office of Community Services
East-West Journal	Office of Refugee Resettlement
FIL-AM Courier	Ohana Ola O Kahumana
Filipino Chronicle	Olelo Community Television
First Chinese Church of Christ	Pacific American Foundation
Goodwill Industries of Hawaii	Pacific Gateway Center
Gregory House Programs	Palama Settlement
Hale Kipa, Inc.	Parents and Children Together
Hawaii Chinese News	Pauahi Community Center
Hawaii Community Foundation	United Puerto Rican Association of Hawaii
Hawaii Foodbank	Queen Liliuokalani Children's Center
Hawaii Hochi	Radio Seoul
Hawaii Immigrant Services	River of Life Mission
Hawaii Literacy	Safe Haven
Hawaii Meals on Wheels, Inc.	Salvation Army Family Services
Hawaii Pacific University	Sing Tao Daily Hawaii Agent
Honolulu Community Action Program	Susannah Wesley Community Center
Housing and Community Development Corporation of Hawaii	The Filipino Community Center, Inc.
US Department of Housing and Urban Development	United Chinese Society
Homeless Solutions	University Avenue Baptist Church
Institute for Human Services	Vietnamese Catholic Community
Kahumana Residential Treatment Services	Vietnamese Community of Hawaii
Kaimuki Christian Church	Volunteer Legal Services of Hawaii
Kalihi Child Care Pre-school	Waianae Coast Comprehensive Health Center
Kalihi-Palama Health Center	Waikiki Health Center
Kalihi Union Church	Weinberg Village Waimanalo
Kaumakapili Church	Young Buddhist Association - Honolulu
KNDI - 1270 AM (Micronesian)	

Services and Public Safety

Community facilities and public services include educational facilities, community centers, churches, libraries, hospitals, social services, and emergency services including police, fire and emergency response. Community/public services in the vicinity of the proposed project will be identified based on information from the City and County General Plan, Public Facilities Maps, DPP, the Honolulu Emergency Services Department, and other pertinent available resources. This section will also address public health and safety. Potential construction period and long-term project-related impacts to these community/public services will be identified.

Utilities

The utility system is comprised of the water, sewer, storm water, electricity, natural gas, and telecommunications systems. Utilities in the vicinity of the proposed project will be identified based on information from pertinent available resources. Potential construction period and long-term project-related impacts to utilities will be identified.

Parklands

Parklands include Federal, State, regional, and local parks and recreational facilities. Parks and recreational facilities in the vicinity of the proposed project will be identified based on information from the City and County of Honolulu General Plan, DPP, the City and County of Honolulu Department of Parks and Recreation, the State of Hawaii Department of Land and Natural Resources, land use and zoning plans, field visits, and other pertinent available resources. Potential construction period and long-term project-related impacts to parks and recreational facilities will be identified.

Farmlands

The Natural Resouce Conservation Service farmlands impact criterion will evaluate any impacts the proposed alternatives would have on farmlands. In preparation for the AA, existing GIS data will be used to identify potential conflicts with "prime" and "unique" farmlands, as identified by "Agricultural Lands of Importance to the State of Hawaii" (ALISH) data. Land use and soils data may also be consulted to support or verify the designation as "prime" or "unique" farmland. For example, if an area is currently designated as "prime" or "unique" farmland according to ALISH, but existing or planned land use indicates that an area is or will be developed; such information will be considered when determining the suitability of the property for use as part of the transit system.

The AA will include a brief description of existing conditions will broadly characterize the farmlands and soils in the study area, while also cross-referencing relevant information from the Land Use analysis. When the project footprint, or "limits of construction," has been identified during the draft EIS phase, the amount of farmland lost as a result of project construction will be calculated and tabulated for each alternative. In particular, proposed impacts to "unique" and "prime" farmland will be noted.

If "unique" and "prime" farmlands are affected by the project alternatives to be discussed in the draft EIS, coordination will be conducted with the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). This coordination may take place before or after the draft EIS is released. Coordination would be initiated by the preparation and submittal of Form AD-1006 or CPA-106 to determine the Farmland Conversion Impact Ratings for each alternative. The size and location of the project's footprint impacts on prime and unique farmlands would be documented on these forms.

If the Farmland Conversion Impact Rating for any alternative exceeds the regulatory threshold of 160 points, alternatives that avoid farmland impacts will be evaluated.

Visual and Aesthetic Resources

The visual impact assessment will address the primary statutes and regulations applicable to visual impacts. These include the National Environmental Policy Act (NEPA) (42 USC Section 4231), Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Highway Beautification Act of 1965 (23 CFR-750), Section 106 of the Historic Preservation Act of 1966, U.S. Department of Transportation (DOT) Act, Section 4(f), and the State HRS Chapters 6E, 58, and 343.

The visual impact assessment will be conducted in accordance with FHWA's Technical Advisory T6640.8, Visual Impact Assessment for Highway Projects guidance (FHWA HI-88-054), and Title 23 U.S.C. 109 (h). Preparation of the visual impact assessment will follow the basic guidance and format as established by FHWA's Memorandum HEV-20 (August 18, 1986) on aesthetics and visual quality and FHWA's *Visual Impact Assessment for Highway Projects* (USDOT, 1983) as published by the American Society of Landscape Architects.

- To support the evaluation of each alternative relative to project objectives in the AA, the number of adverse visual impacts will be tabulated in the Visual Impacts Technical Report.

Alternatives Analysis Phase Methodology

The following basic steps in the visual impact assessment process will be conducted to support the preparation of the AA for the project: establish area of visual effect, characterize existing visual environment, describe landscape units, determine viewer groups, identify visual resources, assess applicable visual policies and guidelines, and evaluate impacts of the proposed alignments and technologies as they relate to the existing visual environment, effects on visual resources, and viewer response to physical changes. A landscape unit is a part of the visual environment that is relatively homogeneous in physical and visual characteristics. Landscape units are used to evaluate visual changes within the area and related visual impacts.

Consultation with Agencies and Special Interest Groups

In developing the scope and methodology for the visual impact assessment, input and feedback from agencies and community/special interest groups will be obtained in order

to ensure that local concerns are incorporated and addressed in the analysis. In particular, presentations to the DPP and community groups with interest, such as The Outdoor Circle will be held to present the approach for the visual impact assessment and ask for feedback and suggestions on the approach. During these meetings, if additional agencies or groups are identified that should also be consulted, an effort will be made to meet with the identified groups to obtain their feedback as well.

Desktop Inventory

A desktop inventory of existing and readily available policy documents and land use ordinances that affect the proposed project area will be conducted in order to obtain relevant data on existing visual conditions and resources within the study area. A literature review of previous relevant visual studies will also be conducted, including that completed for the Primary Corridor Transportation Project (2001-2002), in order to gain additional data regarding existing conditions within the corridor.

The assessment of visual impacts will also be coordinated with the evaluation of the impacts on land use, cultural resources, and natural resources to obtain additional data on historic and cultural resources, unique landforms and trees, and sensitive land uses within the project study area.

Area of Visual Effect

A map will be developed that locates identified visual resources, special districts, and land use zones in relationship to the proposed corridor alignments. The map will be used to identify potential impact areas and to confirm resources and uses in the field. The map will also be used to establish the area of visual effect during field surveys. The area of visual effect includes the proposed alignment corridors that are visible from a variety of viewpoints. It extends to areas that have a view of and from the proposed corridor alignments and identifies potential views that the proposed project could affect and create.

Field Surveys

Field surveys will be conducted to confirm data obtained from agencies and special interest groups and the desktop inventory. Field surveys will also be used to identify potential view corridors along the alignment for use in mapping the area of visual effect. The field surveys will be photo documented to record the existing visual conditions. Field surveys will consist of driving the proposed alignments to confirm visual resource data, establish the character of the visual environment, identify viewer groups, and determine the parameters of the landscape units. Land uses and topography will also be studied to help characterize the physical environment.

Evaluate Existing Conditions

The existing visual environment will be characterized and evaluated to establish relative importance, sensitivity, and quality of the various components within the existing visual environment based on the information obtained from agencies and interested groups, the desktop inventory, and the field surveys. The visual quality of resources and view

corridors will be evaluated using defined attributes as outlined in FHWA's Methodology for Visual Impact Assessments. These defined attributes include the following three factors:

- Vividness – how memorable the view and its key components are
- Intactness – the visual integrity of a view and freedom from encroaching elements
- Unity – the visual harmony and cohesiveness of a view

Evaluate Potential Impacts

The impacts of various segment alignments and technologies will be evaluated for their effect on identified resources, special districts, and land use zones. Compliance with established policy documents and consideration of viewer response will also be used to determine the relative level of impact an alignment or technology may have on the existing visual environment.

Evaluation of specific visual impacts will be based on four components. These components include a change in visual quality; impacts to important visual resources; a change in light, glare, shade, or shadow; and a conflict with applicable visual policies.

Using the photo documentation from the field surveys, key viewpoints will be selected that represent typical views within the proposed corridor. These key viewpoints will also incorporate the range of visual resources, the landscape units, and the viewer groups along the alignment(s).

Change in Visual Quality

First, the existing visual quality for each key viewpoint will be determined using the FHWA criteria based on the three key elements for identifying a quality visual environment: vividness, intactness, and unity. Using a numeric rating scale from 1 (very low) to 7 (very high), a score will be given for each viewpoint under each element. The three numbers will be averaged to establish the visual quality rating for that key viewpoint.

Next, the physical changes that would occur to the existing visual environment will be determined by studying the project plans. The project plans include profiles and information regarding the details of the various elements of the project and provide an understanding of how the future visual environment will look after project implementation. Once these changes are understood, the visual quality of the predicted visual environment can be evaluated in the same manner as for the existing visual environment. The difference in quality between the existing or baseline conditions and the predicted future conditions is the visual quality change. The visual quality change is expressed as either a positive or negative number and as a percentage. If the visual quality score changes by 0 to 14 percent, it is considered a low level of visual quality change. Between 15 and 29 percent, the visual quality change is considered moderate. A 30 percent or more change in visual quality is considered high.

Also considered in the evaluation of change to visual quality is the impact of the change on viewer groups. Visual impact is the combination of visual quality change and viewer sensitivity. To determine the visual quality impact, the sensitivity of each viewer group is identified (USDOT, 1983). The sensitivity of each viewer group is based on their activity, opportunity to observe a view, distance and speed at which they observe a view, and frequency in observing a view (sense of ownership). Viewers with lower than average sensitivity are less responsive to change and would decrease the change in visual quality score by one or more points. The resulting number (visual quality change combined with viewer sensitivity) is the visual quality impact score and can be expressed as either a positive (beneficial) or negative (adverse) number. Residents generally have a high sensitivity to change because they usually observe a view leisurely, with frequency, and for extended periods of time.

Impacts to Visual Resources

Consideration of visual resources requires an understanding of the significance of the resource and its existing condition. This establishes the baseline condition of the resource and allows for evaluation of changes as they relate to the existing environment. Impacts to visual resources are based on the existing visual integrity of the resource, the visible physical changes that would occur to the resource, and the importance of the visual environment to the use of the resource. Impacts to visual resources, which would substantially alter the existing visual integrity of the resource, change its physical appearance, or cause a change to the visual environment that affects the use of the resource, would be considered significant.

Changes in Light, Glare, Shade, and Shadow

The project's effects on ambient light conditions, sources of light and glare, and existing shade and shadow patterns will be discussed. Field observation during various times of the day and night help to establish the existing light conditions. Land uses and associated lighting needs and sources will be noted. The existing light environment is the baseline that is used to compare project impacts and changes in the light environment. Elimination, reduction, or introduction of light sources, glare, shade, or shadows is considered an impact and is evaluated in relationship to existing conditions. Impacts are evaluated on how much the existing conditions change, the effect those changes have on area uses, and the sensitivity of the affected environment to the changes.

Compatibility with Existing Visual Policies

Project related changes will be evaluated in relationship to applicable policies related to special districts, land use zones, or other resources. Proposed project related changes that would conflict with adopted policies are considered significant impacts.

Selected Simulations

Based on the evaluation, a summary will be provided that discusses the unique locations or circumstances that create a particular effect on a key viewpoint. The summary will be used to identify key viewpoints that may require mitigation efforts to reduce potential impacts. Visual simulations of the various alternatives at some of these key viewpoints

will be used to assist in evaluating the potential visual impacts, demonstrate the potential for mitigation, and provide a means of communicating the findings of the analysis.

Mitigation

Additional coordination efforts with agencies and special interest groups will be conducted in order to consider unique and creative solutions for impact resolution, if necessary. General guidelines will be developed to identify potential resources, design features, and alternative methods for mitigation.

Draft EIS Phase Methodology

Once the Locally Preferred Alternative has been selected, the visual impact assessment will be updated to provide any needed additional detail and to develop any needed mitigation measures. The existing visual environment and visual resources identified during the AA process will be used to determine impacts associated with the LPA. The refinement of analysis conducted for the draft EIS will include information and conditions established during the AA Phase, but will focus on the specific alignment(s) and technology as defined by the LPA.

Develop Specific Mitigation

A moderate or high (15 percent or higher) negative change to visual quality is deemed to be substantial and will require development of mitigation measures to reduce the impact. Based on the impact evaluation conducted for the LPA, key viewpoints that are identified as having a moderate or high negative change in visual quality will be reevaluated with the possible mitigation measures. Additional coordination efforts with agencies and special interest groups will be conducted as needed in order to consider unique and creative solutions for impact resolution.

Analysis of Mitigated Conditions

Based on the proposed mitigation measures, a visual simulation of the potential mitigated condition from selected key viewpoints will be developed for use in evaluating the difference between the un-mitigated and the mitigated scenarios. Analysis of the mitigated condition will be conducted in the same manner as the analysis for un-mitigated condition. This will allow for consideration of the effectiveness of the proposed mitigation.

Air Quality

Air quality describes the amount of pollution in the air. Air pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. The air quality analysis will evaluate the expected air quality impact of each proposed alternative. The air quality analysis will include a brief discussion of the EPA's criteria pollutants and transportation-related air pollutants along with their potential health effects. A summary of the air quality analysis to support the AA and draft EIS is discussed below.

- To support the evaluation of each alternative to project objectives in the AA, the change in regional pollutant emissions will be tabulated in the Air Quality Technical Report.

Regulatory and Monitored Air Quality Information (Ambient Air Quality Data)

The most current existing ambient air quality monitoring information for the area will be collected from the Hawaii Department of Health (HDOH) and summarized. This information will be compared to the National and State Ambient Air Quality Standards. In addition, the area's attainment status under the Clean Air Act Amendments will be discussed. Oahu is in attainment with all National Ambient Air Quality Standards.

Alternatives Analysis Phase Methodology (Regional Air Quality Analysis)

A regional mobile source pollutant burdens analysis will be conducted as part of the AA. Pollutants to be analyzed for the project alternatives will include: Hydrocarbons (HC), Nitrogen Oxides (NOx), Particulate Matter 10 microns or less in size (PM_{10}) and Carbon Monoxide (CO). Vehicle miles traveled (VMT) and the associated traffic simulation network speeds will be used in this analysis. Results of this analysis will be used to compare the potential regional pollutant burdens for each alternative. Changes in regional emission levels will be estimated to describe the potential effect the alternatives may have on regional pollutant levels.

Draft EIS Phase Methodology (Local or "Microscale" Air Quality Analysis)

After selection of the locally preferred alternative (LPA), a microscale screening-level analysis will be conducted to determine if a local or "microscale" carbon monoxide (CO) analysis must be conducted. The screening level analysis will compare future No Build conditions to future conditions under the LPA scenario. The screening level analysis will be based on changes in:

- Overall intersection volumes
- Intersection delay
- Intersection level of service

It is currently assumed that up to 3 intersections will fail the screening analysis and require a detailed microscale CO analysis. In consultation with the HDOH, it is expected that CAL3QHC Version 2 will be used as the dispersion model in the detailed microscale carbon monoxide (CO) analysis.

The methodology and input parameters needed to compute emission source strength will be selected. Vehicular emissions will be computed using the latest version of the EPA emission factor algorithm (MOBILE6.2). In consultation with the HDOH, the proper credits to account for state specific parameters shall be selected.

Worst-case meteorological conditions, including wind speed, stability class, ambient temperature and persistence factor will be selected for the microscale analysis. This selection shall be based upon review of the pertinent meteorology for the study area.

Sensitive receptors will be located at each analysis site following EPA guidance. Appropriate background levels will be determined in consultation with HDOH. Background concentrations must be added to modeling results to obtain total pollutant concentrations at each receptor location.

Existing carbon monoxide pollutant levels will be determined. At each of the receptor sites, maximum one- and eight-hour carbon monoxide concentrations will be calculated for one peak-period. Eight-hour values will be determined using an appropriate persistence factor. No field monitoring will be performed as part of this study.

Maximum one- and eight-hour carbon monoxide levels will be calculated for one peak-period for 2030 No Build and LPA scenarios at each of the receptor sites, as per consultation with the HDOH.

Future carbon monoxide levels for each alternative shall be compared to the National Ambient Air Quality Standards, the State Ambient Air Quality Standards, and between the alternatives to determine the potential impacts of each alternative.

Air Toxics Analysis

Air toxics will be evaluated following recently released (2/3/06) U.S. DOT guidance. It is currently assumed that the project will be Level 2 (Project with Low Potential Mobile Source Air Toxic (MSAT) Effects) or Level 3 (Project with Higher Potential MSAT Effects). If the project is a Level 3, FTA will be contacted to determine the necessary analysis procedures.

Noise and Vibration

The following effects of the Honolulu High-Capacity Transit Corridor Project related to noise and vibration will be assessed:

- Noise impacts from the proposed Managed Lane Alternative following FHWA procedures,
- Noise impacts from the proposed fixed-guideway transit alternatives and technologies following FTA procedures,
- Vibration impacts from the proposed fixed-guideway transit alternatives and technologies following FTA procedures, and
- Noise and vibration impacts during construction.

To support the evaluation of each alternative to project objectives in the AA, the number of sensitive receivers affected by noise or vibration levels greater than the impact criteria will be tabulated in the Noise and Vibration Technical Report.

Roadway Noise Assessment Methodology

Alternatives Analysis Phase Methodology

The roadway noise analysis will be prepared to determine the traffic noise impacts associated with the future operations of the proposed Managed Lane Alternative. This

methodology will also be used to predict traffic noise changes in areas where the transit alternatives will require a change in the capacity of local roadways, such as, widening or taking of an existing lane of traffic. The study methods and procedures that will be used in the analysis will be consistent with requirements and guidance provided in 23 CFR 772 and the HDOT Noise Abatement Policy, which are detailed below.

- Identify receiver locations in the project area that could be exposed to traffic noise impacts. This will include review of plans, aerial photographs, and available GIS data.
- Conduct short-term (15-minute) noise measurements of existing sound levels in at least 12 locations with residential and institutional areas that have outdoor areas and frequent human activity that may be affected by the Managed Lane Alternative. Vehicle counts will be conducted and vehicle speeds will be measured during this time as well.
- Digitize the geometric features of the study locations (including roadway lanes, receiver locations, and existing terrain) into a three-dimensional, scaled reference coordinate system in the FHWA Traffic Noise Model (TNM) version 2.5 or the latest version available at the time the analysis is started for both existing and future project conditions.
- Calibrate TNM using the measured sound level data, actual traffic counts, and digitized geometric features for existing conditions.
- Predict traffic noise levels using worst noise-hour traffic volumes under existing and future year conditions based on results from the calibrated traffic noise model. The existing year and design year for the proposed alternatives (No Build and Managed Lane Alternatives) will be analyzed.
- Model the worst noise-hour traffic, which occurs at the highest traffic-volume hour when the roadway operates at or near the speed limit. If the peak-hour traffic volume is worse than level of service (LOS) D roadway capacity, the LOS C/D capacity will be modeled at the speed limit.
- Determine if traffic noise impacts would occur based on the traffic noise modeling results for the proposed alternative under existing and future year conditions. Traffic noise impacts are defined as levels that approach the noise abatement criteria within 1 dBA (i.e. 66 dBA or greater for Category B land uses) or exceed existing noise levels by 15 dBA or more.
- Where traffic noise impacts are identified, noise abatement strategies will be conceptually discussed for the proposed alternative. A detailed noise abatement evaluation will not be completed for the AA report.

Draft EIS Phase Methodology

If the Managed Lane Alternative is selected as the LPA, then mitigation measures will be evaluated for feasibility and reasonableness following FHWA and HDOT criteria. Noise abatement measures likely to be included in the project will be presented in the draft EIS.

Transit Noise Assessment Methodology

Alternatives Analysis Phase Methodology

The project-related noise levels for the transit and technological alternatives will be based on FTA reference sound levels. The operation assumptions (speed, headways, and

schedule) to be used in the noise analysis will be the same as those used in estimating ridership, fare revenue, and other impacts of the project.

The technologies that will be studied for the Fixed Guideway Alternative are: light rail, people movers, monorail, maglev, and rapid rail (electrically powered). The noise impact analysis will be performed by combining project-related noise levels from each transit and technological alternative with the existing noise levels. The resulting change in anticipated noise levels will be compared to the FTA criteria. Based on the identification of potential project-related impacts, appropriate and reasonable mitigation measures will be evaluated.

Noise impacts from rail transit operations are generated from the interaction of wheels on track, motive power, operation of bells and whistles at at-grade crossings controlled by railroad gates, and operation of traction power substations (TPSS) sites. The interaction of steel wheels on rails generates three different types of noise depending on track work. These include: (1) noise generated by pass-by trains operating on tangent track sections, (2) noise generated from wheel squeal on tightly curved track, and (3) noise generated on special track sections, such as at crossovers or turnouts. The noise impact analysis will consider these different sources.

Potentially noise-sensitive land uses and vibration sensitive buildings will be identified as well as appropriate locations for noise and vibration monitoring. Noise levels will be measured at locations along the proposed alternative alignments and near proposed station locations for the purpose of establishing the most sensitive existing environment. All noise measurements will be made in accordance with ANSI procedures for community noise measurements.

To assess the potential noise impacts of the transit operations, long term, 24-hour measurements will be conducted at up to 50 sites with residences and other buildings where people normally sleep. These measurement locations will be supplemented with short-term, 15-minute noise measurements sites as needed to determine the existing noise levels at typical recreational, institutional, and commercial land uses with primarily daytime and evening activity.

Potential noise impacts that may be associated with alternative related park-and-ride facilities and vehicle maintenance and storage facility operations will also be analyzed.

Draft EIS Phase Methodology

If the Fixed Guideway Alternative is selected as the LPA, additional analysis, including detailed noise mitigation evaluation, will be completed to support the draft EIS. Noise abatement measures likely to be included in the project will be presented in the draft EIS.

Transit Rail Vibration Assessment Methodology

Alternatives Analysis Phase Methodology

Vibration impacts from transit operations are generated by motions/actions at the wheel/rail interface. The smoothness of these motions/actions are influenced by wheel

and rail roughness, transit vehicle suspension, train speed, track construction (including types of fixation and ballast), location of switches and crossovers, and the geologic strata (layers of rock and soil) underlying the track. Vibration from a passing train has the potential to move through the geologic strata resulting in building vibration transferred through the building foundation. The principal concern is annoyance to building occupants.

Vibration impacts expected from the Fixed Guideway Alternative will be determined using the detailed vibration assessment information and procedures contained in the FTA's *Guidance Manual for Transit Noise and Vibration Impact Assessment.* The FTA reference levels for a transit vehicle, or if available, vibration measurements from vehicles similar to those proposed by this project, will be used to represent the force density level function of the train. Transfer mobility functions used to determine the ground attenuation will be based on FTA reference data. The combination of the force density and transfer mobility functions will provide an estimate of ground vibration as it relates to distance from the fixed-guideway.

All estimates of ground-borne vibration will be projected to the foundation of each building and do not include any estimates of building coupling loss. The predicted ground-borne vibration levels will be compared to the FTA criteria to determine potential impacts. If a vibration impact is determined at a specific location and the specific fixed-guideway and modal technology alternative is selected as the preferred alternative, more detailed, line-source response measurements will be conducted as part of the preliminary engineering and final EIS phase of the project to confirm and refine the predicted impacts and develop specific vibration control measures.

Potential noise impacts that may be associated with transit park-and-ride facilities will also be identified. The maintenance and storage facility operations for the transit vehicles will also be analyzed.

Draft EIS Phase Methodology

The FTA Vibration Impact Criteria will be used to identify locations where potential impacts may occur based on existing building occupancies and activities.

Construction Noise and Vibration Assessment Methodology

Since the means and methods of construction will not be known until a contractor is selected, the analysis will be based on typical activities and equipment that would be used for demolition, excavation, and erection phases of work. Both daytime and nighttime construction activities will be analyzed since it is likely that the construction work will occur 24-hours a day. Impact equipment, such as pile drivers, is expected to result in levels of ground-borne vibration that could affect nearby buildings. It is also expected that noise levels from these same activities will also be substantial.

Geology and Soils

Based on a literature and map review, the geologic history and conditions of the corridor will be described. In areas where tunnels and/or elevated structures are proposed, the subsurface will be described in more detail. This information will be taken from prior studies in these areas, as no drilling or field sampling will be undertaken until the LPA has been selected.

Natural Hazards

The island of Oahu is subject to flooding, hurricanes, earthquakes, and tsunami. The potential effect of these natural hazards on the various project alternatives will be described. Building codes or other considerations necessary for construction will be noted.

Since protection of floodplains and floodways is required by Executive Order 11988, Floodplain Management; U.S. DOT Order 5650.2, Flood Management and Protection; FHPM-6-7-3-2; and 23 CFR 650, existing floodways and floodplain limits within the study area will be identified using Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) and other existing data. Potential impacts to floodplains and floodways, such as changes to the floodplain elevations and changes to areas subject to flooding, will be identified for each alternative. If necessary, reasonable and feasible measures to minimize floodplain impacts will be proposed.

Water Resources

As most of the transit corridor overlies the Southern Oahu Basal Aquifer (SOBA), a sole source aquifer, a water quality assessment will be initiated to meet the requirements of Section 1424 (e) under the Safe Drinking Water Act. To support the AA, the project alternatives will be evaluated generally based on the extent of the SOBA in the project area.

For the draft EIS, the water quality assessment is intended to provide EPA the necessary information to determine the project's impact on the quality of the groundwater. Surface water resources in the project area will be identified from existing maps. Areas of potential conflict with the project alternatives will be delineated and evaluated, and mitigation measures to reduce impacts will be identified. Techniques to minimize surface water contamination due to increased runoff from additional highway surfaces will be addressed and any necessary permits identified. Potential permits required to cross surface water bodies will be discussed. Should the project require a Clean Water Act Section 404 individual permit from the Army Corps of Engineers, coordination will occur through the "Memorandum of Understanding for the National Environmental Policy Act/Clean Water Act Section 404 Integration Process for Surface Transportation Projects in the State of Hawaii".

The project alternatives will be assessed to determine any impacts on shoreline and coastal resources. Special aquatic sites will be identified and steps will be taken to avoid

or minimize impacts to these areas. Any permits involving the coastal area will be identified.

Construction impacts on water quality will be assessed and mitigation measures proposed. The number of acres disturbed during construction will be tabulated for each alternative and necessary permits will be identified.

Biological Resources and Ecosystems

The following methodology covers the wildlife, vegetation, urban street trees, and wetlands disciplines. A *Natural Resources Technical Report* covering these subjects will discuss existing conditions within the project study area, provide section-by-section descriptions of potential impacts, and specify recommendations. The report will also include documentation of any coordination meetings and decisions with resource agencies. If consultation and coordination activities indicate potential impacts on sensitive stream and coastal biota may occur as a result of the proposed alternatives, additional research will be conducted on the species in question.

The following steps will be undertaken for the Alternatives Analysis:

- Characterize general existing conditions, including conducting the first phase of fieldwork
- Evaluate potential impacts (based on each proposed alternative footprint)
- Provide recommendations and observations per alternative, alignment, and section to assist with determination of a preferred alternative.

After the Alternatives Analysis and selection of LPA by the City Council, more in-depth fieldwork specifically for the LPA will be conducted, if necessary, and the impacts analysis will be refined.

Fieldwork will be conducted to the extent possible from publicly accessible areas, as no rights-of-entry will be obtained for the first phase of fieldwork. However, during the first phase, areas will be identified for potential candidate rights-of-entry to conduct future, more detailed fieldwork.

Wildlife Biology

Literature review and fieldwork will be conducted to evaluate sections of the proposed alternatives for any protected, rare, or endangered wildlife species. Analysis will be conducted for each alternative and the potential impacts to protected species and to provide appropriate recommendations to minimize impacts will be described in the *Natural Resources Technical Report.*

Previous studies, pertinent literature and the United States Fish and Wildlife Service (USFWS) Critical Habitat maps for Oahu will be obtained and reviewed for the study area prior to undertaking the wildlife field survey. Topographic and aerial maps will be examined to determine terrain and habitat characteristics, access, boundaries, and

reference points. In addition, a request to the Hawaii Biodiversity and Mapping Program (HBMP) for a database of federal and State protected species (plants and animals) will be made and the information reviewed as part of the AA process. The spatial parameters for the HBMP search will be established following the literature review and a scoping field inspection of the alignments will be conducted section-by-section, in order to eliminate those areas that are unlikely to harbor habitat for biological species (*e.g.* highly urbanized and built areas). Coordination with federal and state resource agencies, namely the USFWS and the State Department of Land and Natural Resources (DLNR) will be conducted to help determine potential interactions with protected species.

A general description of the habitat types in the study corridor will be provided for all of the build alternatives. Modified point count surveys (Blondel, et. al., 1981) will be conducted along the corridor in areas having wildlife habitat such as forests, wetlands, shrub, parks, and within street trees in urban environments. The width of the survey corridor for each alignment will be 100 feet from either side of the centerline of the proposed alignment. In areas where effects to wildlife are expected to extend beyond 100 feet, the width of the survey area will be expanded as needed.

A modified point count method will be used to sample bird habitat along the various alignments. The method allows quantitative results in a short period of time. The point count method gives the number of species and quantitative information in the form of an index of abundance. Objective comparisons of a species' abundance can be made between the index of abundance of two or more alignments or habitats, because data are reflected as measures of dispersion about the mean values and the results can be compared by statistical tests if required.

The presence and "species richness" of native, migratory, threatened, and endangered species will be determined through the modified point count method. Any habitat along the alignment that supports such species will be identified. The list of species obtained during the point counts allows a comparison of the number of species (species richness) in each habitat or alignment. Two parameters of richness will be measured. The average number of species per point count station is the "mean richness". "Total richness" is a cumulative parameter representing the total number of species sampled in the habitat or alignment. The values for mean richness and total richness for each site will be reported for each alternative to quantify the wildlife value.

For sections of the corridor where protected species (federal and/or state) have previously been reported, a follow-up survey will be conducted to determine the status of the populations. Any prior reporting will be identified through the Hawaii Natural Heritage Program database, published reports, and interviews with resource agencies. State and federally listed species found within any of the proposed corridors or nearby habitat that may be impacted will be mapped using a Global Positioning System (GPS).

If necessary, more in-depth work will be conducted for the LPA after it is selected.

Vegetation Biology

Literature review and fieldwork will be conducted to evaluate the proposed alignments for any protected, rare, or endangered plant species. The potential impacts on protected species will be described in the *Natural Resources Technical Report.*. Analysis will be conducted for each section.

Previous studies, pertinent literature and the USFWS Critical Habitat maps for Oahu will be obtained and reviewed for the study area prior to undertaking the botanical field survey. Topographic and aerial maps will be examined to determine terrain and habitat characteristics, access, boundaries, and reference points. In addition, a request to the HBMP for a database of federal and state protected species (plants and animals) will be made and the information reviewed as part of the AA process. The spatial parameters for the HBMP search will be established following the literature review and a scoping field inspection of the alignments will be conducted section-by-section, in order to eliminate those areas that are unlikely to harbor habitat for biological species (*e.g.* highly urbanized and built areas). Coordination will be conducted with federal and state resource agencies, including the USFWS and the DLNR to help determine potential interactions with protected species.

A general description of the vegetation types will be provided for all of the build alternatives. The width of the survey corridor will be 100 feet from either side of the centerline of the proposed alignment. In areas where effects to vegetation are expected to extend beyond 100 feet, the width of the survey area will be expanded as needed.

Each section will be rated for relative abundance of introduced vegetation. For sections of the corridor where rare or endangered species have been previously reported, a follow-up survey will be conducted to establish if the plants or populations still exist. Federally listed plants found within any of the proposed corridors will be documented by photographs and mapped using GPS.

If necessary, more in-depth work will be conducted for the LPA after it is selected.

Street Trees

A certified arborist will conduct the work pertaining to street trees described below.

To generally characterize existing street tree conditions, all past tree surveys conducted in the area will be reviewed, in particular, the tree inventory conducted for the Primary Corridor Transportation Project (2001-2002). Site visits will then be undertaken in all proposed corridors under consideration in the AA process. For those corridors that were previously inventoried, any changes in conditions from the previous survey to the present will be noted.

On corridors that were not previously surveyed, a preliminary tree survey will be conducted to generally characterize each alignment. During this initial evaluation, the following types of data categories will be noted for each section of each alignment:

- Location of trees (not individuals, but predominance)
- Quantities of trees in clusters
- Tree species
- Tree condition – such as approximate height, crown spread, health, notable or exceptional tree
- Potential for successful transplanting
- Other comments – including if white terns are observed nesting in trees

Once the project footprint and the profile (height) of the alignments have been determined, the certified arborist will use the data collected to evaluate what tree impacts are likely to occur for each segment of each alignment. An important factor for this evaluation will be the mode and technology proposed, and whether that system will be at-grade, elevated, or below-grade. The certified arborist will evaluate each alignment, based on its potential impact to the stability and health of trees along that alignment.

For at-grade alignments, or segments of alignments, issues to consider include:

- Impacts to roots during construction
- Locations of transit stations
- Pruning impact on existing trees (side pruning, crown raising, crown reduction, removal, replacement, transplanting)

For elevated alignments, issues to consider include:

- Pruning impact on existing trees (side pruning, crown raising, crown reduction, removal, replacement, transplanting)
-
- A pruning schedule and maintenance costs will also be determined in order to maintain proper clearance for an elevated fixed-guideway system.

For below-grade (tunnel) alignments, the following impacts to trees may occur, depending on the construction method used (open trenching or boring):

- Required crown pruning to compensate for root pruning
- Tunneling impacts on root structure

As part of the AA process, recommendations for alignments will take into account the ideas and suggestions of other stakeholders, such as The Outdoor Circle, the City's Department of Parks and Recreation, and other community groups, such as neighborhood boards.

The recommendations will identify issues such as treatment of trees for each alternative. In particular, the certified arborist will identify recommended actions, such as pruning, transplanting, removal and replacement options.

After completion of the AA and selection of LPA, more in-depth fieldwork and data collection will be conducted to provide more complete information about street trees along the LPA alignment. This information will be included in the draft EIS. Data categories to be captured during fieldwork will be identified. Data categories are anticipated to be similar to the categories listed above, but the measurements would be more precise than in the initial evaluation, and data requirements may change based on project needs and coordination with others. The arborist will provide procedures for tree pruning (both crown and roots) that may be incorporated into the project landscaping plan (which would be completed at a later date).

Wetlands

Fieldwork will be conducted to identify and quantify any areas within each of the proposed corridors for ground conditions that would qualify as jurisdictional wetlands or waters of the United States. Functions and values (i.e., water bird habitat, storm water storage, riverine watercourse, etc.) will be qualitatively determined for any wetlands potentially affected. All wetland determinations will follow the U.S. Army Corps of Engineers' 1987 Wetlands Delineation Manual.

Alternatives Analysis Phase Metodology

Areas of concern regarding potential wetlands will be addressed as follows during the AA phase:

- Preliminary determination of wetlands will begin with a review of the hydric soils present within the study area utilizing the NRCS Soil Survey of Oahu and visual investigation.
- Areas that appear to be potential wetlands will be investigated further; hydrophytic vegetation will be documented by creating a list of all plant species present in the area, including estimated percent cover and indicator categories listed in the "National List of Plant Species that occur in Wetlands: Hawaii (Region H)" (U.S. Fish and Wildlife Service, 1988).
- Those areas with hydrophytic vegetation will be further examined for hydrology and presence or absence of hydric soils by digging test pits in order to determine if they possess characteristics that are associated with reducing soil conditions. All information will be applied to the Army Corps of Engineers Routine Wetland Determination Data Form (1987).
- Rough boundaries of proposed wetlands will be mapped using GPS, and wetland functions and values will be qualitatively described.

Draft EIS Phase Methodology

Following the selection of the LPA, wetlands pertinent to the LPA will be delineated for evaluation in the draft EIS. If wetland impacts are anticipated, consultation will be conducted with the Army Corps of Engineers and other resource agencies as necessary. The results of the delineation, anticipated impacts, and proposed mitigation will be documented in a separate technical document, to be prepared for use in the Draft EIS.

The functions and values of affected wetlands will be assessed in more detail to help estimate the amount of compensatory mitigation that may be required.

Recommendations will be made for in-kind, in-place mitigation measures to the extent possible.

Energy

To support the evaluation of each alternative to project objectives in the AA, the change in transportation-related energy demand will be tabulated in the Energy Technical Report.

Operational energy consumption analysis within the project study area will be based on the transportation analyses prepared for this project and proposed transit operations. Net changes in overall transportation energy use in the study area will be assessed using daily vehicle miles traveled (VMT) and speed values calculated from the transportation demand forecasting model for the study area. Energy consumed by electrically-powered transit operations for the fixed guideway alternative also will be calculated.

The alternatives will be compared based on daily differences in fuel consumed by traveling vehicles (USDOT, 1980). This value is approximate for each alternative and does not include several factors, such as energy consumption for facility maintenance and signal operation; however, it provides an appropriate basis for comparison between the alternatives.

Estimates of operational energy requirements for the fixed-guideway system will be based on calculations of direct propulsion energy and indirect energy needs such as energy lost during transmission from the energy generation site to the transit system vehicles. Propulsion energy consumption for a light rail high-capacity transit system typically ranges between 50,000 and 100,000 BTUs per vehicle-mile (Caltrans, 1983). An electrically driven transportation system also requires transfer of energy from a power generation plant to the transit vehicles. This includes typical losses during generation, transmission, and conversion of alternating to direct current. Caltrans estimated the conversion energy factor at approximately 27 percent.

Construction energy consumption will be estimated for each of the alternatives by estimating the energy consumed based on the construction cost of the project. An approximate construction energy consumption factor for project elements on structure, adjusted to year 2002 construction cost dollars, for concrete box girder structures is 10.7 million BTUs per thousand 2002 dollars of construction cost. This factor will be adjusted to local conditions and applied to the estimated project construction cost to estimate construction energy consumption.

Hazardous Materials

Hazardous materials and wastes may be present along or adjacent to the proposed project corridor and may be encountered during construction. A preliminary review of documents addressing areas within the project corridor (Primary Corridor Transportation Project: Hazardous Materials Survey Report, 2002; Nimitz Highway Improvements: Phase I Environmental Site Assessment, 1997; and North-South Road Corridor Study: Hazardous Materials Technical Report, 1997) indicates the potential occurrence of hazardous materials at several sites along the project alignment. Potential hazardous materials sites will be further investigated during preparation of the *Hazardous Materials Technical Report*, which will include a review of the hazardous materials and wastes files maintained by the State of Hawaii Department of Health.

Alternatives Analysis Phase Methodology

A hazardous materials/waste assessment will be prepared as part of the environmental evaluation based on the American Association of State Highway and Transportation Officials (AASHTO) guidance and in conformance with the Federal Highway Administration's Interim Guidance: Hazardous Waste Sites Affecting Highway Project Development (USDOT, 1988) and Supplemental Hazardous Waste Guidance (USDOT, 1997).

The AA process requires a comparative evaluation of environmental impacts. The following analyses will be performed as part of the AA process:

Environmental Database Search

A database search will be conducted utilizing the most current hazardous materials/waste database information obtained from Environmental Data Resources, Inc. (EDR). This search will include existing federal, state, and proprietary environmental databases per the American Society for Testing and Materials (ASTM) standards for environmental site assessments (E1527-00). For the database review, properties identified as being located adjacent to the project will be considered to be those properties that are located within 250 feet of the estimated construction limits for each alternative, while properties identified as being located within the project boundary are considered to be those properties that are located within 100 feet of the estimated construction limits for each alternative. The search distances to be utilized for each database are as follows.

- Federal National Priorities List (NPL)/Superfund: within 1.0 mile
- Proposed National Priority List Sites (Proposed NPL): within 1.0 mile
- Delisted National Priority List Sites (Delisted NPL): within 0.5 mile
- Federal Superfund Liens (NPL Liens): within project boundary
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS): within 0.5 mile
- CERCLIS-No Further Remedial Action Planned (CERC-NFRAP): within 0.25 mile.
- Corrective Action Report (CORRACTS): within 1.0 mile
- Resource Conservation and Recovery Information System (RCRIS-TSD): within 0.5 mile

- RCRIS generator facilities:
    - Small Quantity Generators (SQG): within project boundary
    - Large Quantity Generators (LQG): adjacent to project boundary
- Emergency Response Notification System (ERNS): adjacent to project boundary
- Hazardous materials Incident Report System (HMIRS): within project boundary
- Engineering Controls Sites List (US ENG CONTROLS): adjacent to project boundary
- Institutional Controls Sites List (US INST CONTROL): adjacent to project boundary
- Department of Defense (DOD): within 0.5 mile
- Formerly Used Defense (FUDS): within 1.0 mile
- US Brownfields: adjacent to project boundary
- Superfund (CERCLA) Consent Decrees (CONSENT): within 0.5 mile
- Records of Decision (ROD): within 0.5 mile
- Uranium Mill Tailings (UMTRA): within 0.5 mile
- Open Dump Inventory (ODI): within 0.5 mile
- Toxic Release Inventory System (TRIS): within project boundary
- Toxic Substances Control Act (TSCA): within project boundary
- Federal Insecticide, Fungicide, and Rodenticide Act/Toxic Substances Control Act (FIFRA/TSCA), also known as FTTS: within project boundary
- Section 7 Tracking Systems (SSTS): within project boundary
- Polychlorinated Biphenyl (PCB) Activity Database System (PADS): within project boundary
- Material Licensing Tracking System (MLTS): within project boundary
- Mines Master Index File (MINES): adjacent to project boundary
- Facility Index System (FINDS): within project boundary
- RCRA Administrative Action Tracking System (RAATS): within project boundary
- State Hazardous Waste Sites List (SHWS): within 1.0 mile
- State Solid Waste Facilities/Landfill Sites (SWF/LF): within 0.5 mile
- Leaking Underground Storage Tanks (LUST): within 0.5 mile
- Underground Storage Tank-Registered (UST): within project boundary
- Release Notification (SPILLS): within project boundary
- Sites with Institutional Controls (INST CONTROL): adjacent to project boundary
- Voluntary Response Program Sites (VCP): within 0.5 mile
- State Brownfields: adjacent to project boundary
- Indian Reservations (INDIAN RESERV): within 0.5 mile
- Manufactured Gas Plants: adjacent to project boundary
- EDR Historical Auto Stations: within 0.5 mile
- EDR Historical Cleaners: within 0.25 mile

Data Analysis and Documentation

Potential contaminant sources identified during the EDR database review will be screened to develop the environmental baseline conditions to determine their potential impact to the project based on distance from the project alignment. The number of sites that have the potential to affect a particular alternative will be tallied in a matrix to be

used for comparative evaluation. A draft Preliminary *Hazardous Waste Technical Report* will be prepared.

Draft EIS Phase Methodology

Further detailed technical analysis will be used to support the draft EIS once the LPA has been selected. The following tasks will be performed to further evaluate the LPA:

Review of Historical Land Use

A review of available maps and historic aerials will be conducted to identify any past business uses in the immediate project vicinity that could have a negative impact on the proposed project in terms of hazardous materials and wastes.

Site Reconnaissance

Site reconnaissance of the proposed project alignment will be conducted to evaluate the properties identified as part of the EDR database search for potential sources of hazardous waste and materials contamination that may adversely impact the proposed project area. In addition, any additional properties or businesses within approximately 1,000 feet north, east, west, or south of the proposed project alignments that show visual evidence of potentially using, storing, or handling hazardous materials/waste that could impact the proposed project, will be recorded. The site reconnaissance will be conducted from public access areas and from within the project site, as feasible, in accordance with ASTM E1527-00. Information will be recorded regarding the site location, the general "housekeeping" of the site, and other observed conditions that might indicate a potential environmental concern.

In addition, the Hawaii State Department of Health Office of Hazard Evaluation and Emergency Response (HEER) facility and sites databases will be reviewed to determine if there are any hazardous materials and waste sites or facilities, beyond those identified during the EDR database search, examination of maps and historic aerials, and site reconnaissance that could potentially impact the proposed project.

Agency Records Review

After gathering the above noted information, the list of potential contaminant sources will be narrowed based on the type of site (e.g., database listing type), the distance from proposed project activities (see EDR search distances), and the information gathered during the site reconnaissance. A regulatory agency file review will then be conducted at the Hawaii State Department of Health on the narrowed list of potential contaminant sources to develop additional site-specific information on selected properties. The agency files will be reviewed for the most recent site status information, the nature and extent of contamination, as well as pertinent land uses, geologic, hydrogeologic, and other information that may be used to assess potential impacts to the project.

Data Analysis and Documentation

Potential contaminant sources identified while conducting the above noted review and analysis will be screened to determine their potential impact to the LPA based on the following criteria:

- The occurrence of a documented release, based on either public records or physical observation;
- The physical, chemical, and toxicological characteristics of suspected contaminants released from potential sources, and the potentially affected media (soil, water, and/or air)
- Distance from the project alignment;
- Nature of proposed design and construction activities in relation to the location and possible impact from the potential contaminant source; and
- Estimated groundwater flow, direction, and depth.

These criteria will be used to eliminate potential sources that are unlikely to present an impact to the project. Potential contaminant sources not eliminated during this screening process will be identified and recommended for further evaluation. Potential impacts related to hazardous materials and wastes will be identified qualitatively. Mitigation measures, such as avoidance, remediation, containment, and/or other alternatives will be recommended. Qualitative statements, based on existing information, will be made about the possibility of acquiring additional project ROW with possible contamination issues. Project alternatives will be compared in terms of their expected level of involvement with hazardous materials issues.

A definitive assessment regarding the actual presence or absence of contamination will not be addressed in this Hazardous Waste and Materials Technical Report. The intent of the assessment is to identify reported and obvious potential hazardous conditions that would need to be addressed or considered before proceeding with project construction. The technical report would not meet "innocent landowner" provisions provided under CERCLA that establishes a defense for the purchase of real property. This technical report will not guarantee, imply, or assert that all potential contaminant sources have been located due to the possible presence of an unlisted or unidentified contaminant occurrence. The presence of aerially deposited lead (ADL), asbestos-containing material (ACM), lead-based paint, and radon gas, will not be evaluated as part of this assessment. The presence of ADL contamination in soils and the presence of lead in traffic striping, that would be impacted by construction, will need to be evaluated during final design and disposed of, if necessary, during construction.

Cultural, Historic, and Archaeological Resources

Requirements of the National Environmental Policy Act (NEPA), Section 106 of the National Historic Preservation Act (Section 106), Chapter 6E Hawaii Revised Statutes (HRS), and Act 50 of the year 2000 Hawaii Session Laws (Act 50) will be addressed after the LPA has been selected. These requirements will be addressed in reports

prepared and subject to full public disclosure and review in conjunction with preparation of the draft EIS.

The information for the AA environmental technical reports will form the foundation for compliance with relevant federal and State environmental laws, but formal consultation under these laws will not commence until after the LPA is selected.

In the State of Hawaii, the review of cultural resources includes an evaluation of cultural practices in addition to areview of historic structures and archaeological resources. The review and evaluation of cultural practices is presented as part of the Cultural, Historic and Archaeological resources assessment and is discussed below.

Cultural Properties and Practice

Alternatives Analysis Phase Methodology

Agency consultation

The Office of Environmental Quality Control (OEQC) and the Office of Hawaiian Affairs' Native Hawaiian Rights Division (OHA) have been consulted to confirm their support of using the same approach and methodology as the Primary Corridor Transportation Project to identify and assess cultural practices in the proposed study area . This approach was proposed due to the similarity between the Primary Corridor Transportaiton Project and the Honolulu High-Capacity Transit Corridor Project and the recent completion of the Primary Corridor Transportation Project study.

OEQC confirmed that the approach and methodology utilized in Primary Corridor Transportation Project was technically appropriate for the Honolulu High-Capacity Transit Corridor Project. OEQC recommended consulting with OHA on cultural compliance. OHA's Native Hawaiian Rights Division also concurred with using the approach and methodology utilized in the Primary Corridor Transportation Project project for the Honolulu High-Capacity Transit Corridor Project, but recommended that greater review be given to the areas of more intensive use (i.e. station sites, areas where buildings may be removed or relocated, and areas of greater visual impacts). In addition, the State Historic Preservation Division (SHPD) was consulted on the general approach and methodology. SHPD had no objections to the proposed approach and methodology and only advised the cultural resources team to engage in proactive community outreach efforts.

Desktop inventory

A comprehensive desktop inventory of existing literature related to cultural practice assessment for the pertinent areas will be conducted. Information from prior studies as well as independent research at OEQC, SHPD, and other available resources will be used.

Develop a comprehensive database of cultural and ethnic resources

Since extensive community outreach and consultation is not practicable given the scope of the study area, a database of cultural and ethnic individuals and organizations within the study area will be developed. The database will be composed from various lists of

resources, including the environmental justice contact list used for outreach during the scoping process, the community outreach list developed by the project's public involvement team for the Honolulu High-Capacity Transit Corridor Project, Hawaiian Civic Clubs, Hawaiian Homesteads, and Neighborhood Boards.

Mail cultural resource letters to members included in the database
Once a comprehensive database has been prepared, the consultants will mail a "cultural resources" letter to all those on the database. The letter will request information on the identification and scope of "valued cultural, historical, or natural resources" in the study area, including the "extent that traditional and customary native Hawaiian rights are exercised" in the study corridor. The letter will also request the identification of anyone else that should be contacted or consulted who may have information related to cultural or ethnic practices within the study area. The letter will request a response within thirty (30) days of receipt of the letter. The purpose of this task will be to cast as large a net as possible to reach out to as many individuals, groups, or organizations that may have information that will be useful in identifying cultural practices and assessing the impact the project will have on those cultural practices.

The information provided from the mail outs will be used to: identify cultural or ethnic practices within the study area, assess potential adverse impacts to the cultural practices, and provide potential mitigation measures to minimize adverse impacts.

Identify a list of cultural or ethnic practitioners within the project area.
A list of cultural or ethnic practitioners that may assist in identifying cultural practices and in determining the "extent to which those resources including traditional and customary native Hawaiian rights will be affected or impaired by the proposed action" will be developed.

Conduct a field survey to update Primary Corridor Transportation Project information.
A windshield survey to confirm and update the cultural practices identified in the Primary Corridor Transportation Project study will be conducted. OEQC, OHA, and SHPD have agreed that that supplementing the areas previously reviewed, which did not consider intensive excavation or construction, would be sufficient. The same definition of "cultural practice" as utilized in the Primary Corridor Transportation Project will be used to ensure consistency and relevancy. Accordingly, "cultural practice" shall be defined as a traditional cultural practice that is being conducted in an urban setting; and traditions, beliefs, practices, life ways, and societal history of a community and its traditions, arts, crafts, music, and related social institutions. The same cultural practice categories will be utilized: (1) food, (2) dance, (3) physical practices and health arts, (4) arts, crafts, and museums, (5) flora, (6) theatre, (7) religious practices, (8) cultural organizations, (9) music, (10) festivals and ceremonies, and (11) miscellaneous.

Conduct a field survey of the "new" areas and identify cultural practices.
Once the previously surveyed areas have been updated, field surveys will be conducted for the "new" areas. A set of standard criteria to identify the existence of cultural or ethnic practices, as well as to assess the impacts of the project on the found and potential cultural practices will be used in the survey.

Review the public announcements and publications.
A review of public announcements and publications (including radio public service announcements, news and activities sections of the *Honolulu Advertiser*, *Honolulu Star-Bulletin*, *Honolulu Weekly*, and *MidWeek* organizational and topic area web sites, government permits and reservations, programs and schedules of major facilities) will be reviewed to identify cultural practices within the study area. This information will supplement other means of identifying cultural practices within the study area and developing potential mitigation measures to avoid these areas during dates of known cultural activities.

Develop a comprehensive list of cultural practices within the study area.
A comprehensive list of all the cultural practices for the various alternative alignments within the study area will be developed, based on the above discussed data and information. This list will update the previously surveyed areas and identify cultural practices for the newly surveyed areas. The team of cultural experts will be consulted in the case of insufficient or conflicting information on a particular cultural practice.

Assess effects of the Honolulu High-Capacity Transit Corridor Project on the cultural practices.
The extent to which access to the identified cultural practices would be affected by the Honolulu High-Capacity Transit Corridor Project during construction or implementation of the project and the nature of the identified cultural practice affected by the proposed project will be determined and documented.

Draft EIS Phase Methodology

The cultural practices identified during the AA process will form the foundation for the cultural assessment component of the draft EIS, the Act 50 cultural impact statement and Section 106 compliance. The Act 50 cultural impact statement and the draft EIS cultural assessment will be cumulative from the AA process and not duplicative. The Act 50 report will be updated with any additional information gathered after the *Cultural Resources Technical Report* supporting the AAwas prepared.

Detailed mitigation analysis will be prepared for the Locally Preferred Alternative.
Appropriate mitigation strategies will be developed in conjunction with experts. Mitigation measures could include designing elements to enhance the cultural practices in the urban environment.

Conduct the Ka Pa'akai analysis.
The Hawaii Supreme Court recently held in the case, ***Ka Pa'akai O Ka'aina v. Land Use Commission***, 94 Haw. 31, 7 P.3d 1068 (2000), that the "State and its agencies are obligated to protect the reasonable exercise of customarily and traditionally exercised rights of Hawaiians to the extent feasible. . . . The past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence,

development, and exercise of native Hawaiian culture" under *Act 50, H.B. No. 2895, H.D.1, 20th Leg. (2000)*. Accordingly, the Hawaii Supreme Court provided an analytical framework in an effort to effectuate the State's obligation to protect native Hawaiian customary and traditional practices while reasonably accommodating competing private interests. The agency must, "at a minimum" make specific findings and conclusions as to the following: identify the scope of "valued cultural, historical, or natural resources" in the project area, including: the extent to which traditional and customary native Hawaiian rights are exercised in the project area; the extent to which those resources, including traditional and customary native Hawaiian rights will be affected or impaired by the proposed action; and, the feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

The analysis will provide sufficient information on the cultural practices to support a well-reasoned analysis and informed decision on preserving and protecting native Hawaiian rights to the extent feasible in selection of the preferred alternative.

Detailed analysis for Section 106 consultation process.
The efforts to contact, identify, and consult with various cultural and ethnic groups during the AA process will be documented as part of the Section 106 consultation process. Any additional information or cultural information gathered after the preparation of the *Cultural Resources Technical Report* supporting the AA report will be documented during the Section 106 process. Further, the mitigation analysis will assist in the compliance with Section 106 to draft an appropriate programmatic agreement or memorandum of agreement.

Historic Resources

A review of the proposed alignments' historic resources will be conducted as part of the AA process. The data collection, review and analysis of the historic resources along the alignment are discussed below.

- To support the evaluation of each alternative to project objectives in the AA, the number of direct impacts to identified historic resources will be tabulated in the Historic and Archeological Resources Technical Report.

Alternatives Analysis Methodology

The AA process will include an initial-level identification of potential historic properties and districts within the study area. The study area's boundaries are determined directly by the alignments currently under consideration. The study area includes all properties on both sides of each alignment (one tax map lot deep). This definition was previously approved by SHPD in 1999 for use by the Primary Corridor Transportation Project.) Historic view planes will not be assessed in this phase of work; view planes will be assessed in the draft EIS phase after the LPA has been selected.

A preliminary list, identifying potential historic resources in the study area, was created using City and County of Honolulu Geographic Information Systems (GIS) data. The historic resources included in the list are those found in lots along the proposed

alignments that have year-built dates close to or more than 50 years old by the year 2015, which is the project's targeted completion date. Accordingly, the year-built, cut-off dates for the historic resources along the proposed alignments are 1965 or earlier. There are currently approximately 1,000 historic properties along the proposed alignments.

Once a locally preferred alignment (LPA) has been selected, official consultation with SHPD will be conducted to determine the Area of Potential Effect (APE).

Existing Conditions

The historic resources identified in the previous step will be organized to show which properties have been reviewed in previous studies, and/or are included in the SHPD's State and National Register Lists. Properties will be organized by tax map key (TMK), and will include information as to their addresses and names if available. All buildings will be reviewed and documented to determine if they:

- are on the National Register;
- are on the Hawaii Register;
- have been officially Determined Eligible (DE) for the National Register (NR);
- have had a concurrence on eligibility for the NR; or
- have not yet been studied.

Several studies for earlier Honolulu transit proposals will be reviewed for this analysis. The previous studies to be reviewed include:

- Honolulu Area Rail Rapid Transit Project, Historic Sites Survey, 1980. (Glenn Mason, Charles R. Sutton & Assoc., Inc.)
- Historic Site Inventory Report for the Honolulu Rapid Transit Development Project, August 1989. (Spencer Mason Architects)
- Primary Corridor Transportation Project: Product 7-12 Historic/Cultural Resources Impacts Technical Report, May 1999. (Mason Architects, Inc.)
- Nimitz Highway Improvement Project, Historic Resources Survey Phase II, January 2005. (Mason Architects, Inc.)

The previous studies' identification of historic districts and resources will be incorporated into the Existing Conditions/Baseline Environmental Report, which will also include a discussion of the historic districts that are within or adjacent to the alignment/study area borders. Informational meetings will be held with the SHPD and the Historic Hawaii Foundation (HHF) during the phase of work associated with the *Affected Environment/ Environmental BaselineReport.*

Technical Report: Initial Field Survey

to the *Historic and Archeological Technical Report* will document the above noted historical resource data collection, information gathering, field visits, and analysis. The field survey will assess the architectural integrity of all of the resources in the study area and resources that are potentially eligible for the National Register, those that need

additional study, and those that appear ineligible for the National Register will be listed in the report.

The technical report will also generally assess the effects on historical resources along each of the alignments and include a discussion of typical mitigation measures. Mitigation measures *specific to the historic resources* will not be provided during the AA process, but will be identified once an LPA has been selected.

Draft EIS Phase Methodology

Once a locally preferred alternative has been selected, a draft EIS will be prepared, requiring adherence to Section 106. Compliance with Section 106 will entail consultation with the State Historic Preservation Division to:

- Identify other parties with historic preservation focus;
- Define the Area of Potential Effect (APE);
- Determine the eligibility of properties identified within the APE (according to National Register Criteria);
- Make a determination of effect; and
- Develop specific mitigation measures to resolve anticipated adverse effects.

The methodology to define and address the above noted questions will be refined for the draft EIS phase of work as the project progresses. Currently it is anticipated that the items listed above will involve the following:

- Identify Parties: Historic Hawaii Foundation has been identified to participate in consultations. The Advisory Council on Historic Preservation (ACHP) may also be involved in the consultation process. Additional parties are yet to be determined.
- APE: SHPD may require that additional properties/lots be studied that were not included in the original study area, but should be included in the APE, particularly for addressing view plane issues. For example, additional lots might need to be assessed at intersections where the transit structure is elevated or at station stops (since these structures may create view plane obstructions to additional historic resources/lots). If this is the case, a follow-up field survey will be undertaken in the same manner as described above in the AA phase of work.
- Determine Eligibility: To assist in making determinations of eligibility for those resources identified as needing additional study, further research will take place, possibly to include research in the SHPD files. It is possible that historical context studies may be required by SHPD as well.
- Determination of Effect: The determination of effect will be coordinated with SHPD following a process to be developed in the future.
- Mitigation Measures: The development of a Memorandum of Agreement (MOA) or Programmatic Memorandum of Agreement (PMOA) may be necessary.

Archaeological Resources

Archaeological and historic background research and limited field inspection will be used to identify previously documented archaeological resources and areas of potential archaeological resources within the proposed study area. Based on available data, the potential impacts of project construction on archaeological resources within various portions of the study area will be evaluated. Preliminary mitigation recommendations will be provided for potential project-related adverse effects on archaeological resources.

The following resources and activities will be employed to identify areas of archaeological concern within the study area:

- Inspection of soil surveys for presence of soils and sands (under or immediately adjacent to the study area) which, based on past experience, are more likely to contain archaeological deposits.
- Inspection of tax maps and historic maps showing presence of Land Commission Award (LCA) parcels within or adjacent to the study area.
- Maps and other documents associated with the LCA may give clues to settlement areas within and near the study corridor in the mid-1850s. These areas may represent, in turn, traditional Hawaiian settlement areas and will be reviewed as part of the AA process.
- Review of Geographic Information System (GIS) data and archaeological reports at the State Historic Preservation Division. The GIS data and archaeological reports will give specific information on the location and distribution of previously-recorded surface and subsurface archaeological sites within or near the study area that may be associated with subsurface historic properties. Additionally, archaeological reports may present results of subsurface testing in proximity to the study area.
- Inspection of historic maps, including the Sanborn Fire Insurance maps and early survey maps to locate areas of potential archaeological concern.
- Field inspection of portions of the study area. The primary purpose of the field inspection is to evaluate the relationship of the study area to possible surface and subsurface archaeological resources. Areas adjacent to streams and wetlands are examined for possible archaeological potential.
- Consultation with the SHPD to draw on their resources and expertise.

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